QST

MARCH 1961
50 Cents
55c in Canada

devoted entirely to

amateur radio



IN THIS ISSUE— A 90-WATT S-BAND TRANSMITTER

THE STANDARD OF COMPARISON FOR ALMOST 30 YEARS

HIGH FIDELITY TRANSFORMERS

FROM STOCK

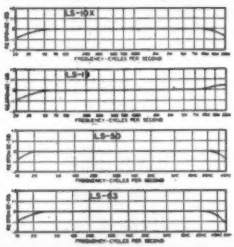
TYPICAL UNITS

LINEAR STANDARD series

Linear Standard units represent the acme from the standpoint of uniform frequency response, low wave form distortion, thorough shielding and dependability. LS units have a guaranteed response within 1db. from 20 to 20,000 cycles.

Hum balanced coil structures and multiple alloy shielding, where required, provide extremely low inductive pickup.

These are the finest high fidelity transformers in the world, 85 stock types from milliwatts to kilowatts.



LS-10X Shielded Input
Multiple line (50, 200, 250, 500/600, etc.) to 50,000 ohms . . . multiple shielded.

LS-19 Plate to Two Grids
Primary 15,000 ohms.
Secondary 95,000 ohms C.T.

LS-50 Plate to Line
15,000 ohms to multiple line . . . +15 db. level.

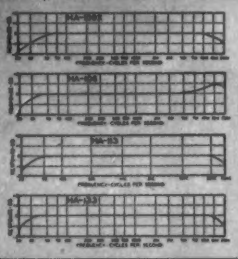
LS-63 P.P. Plates to Voice Coil
Primary 10,000 C.T. and 6,000 C.T. suited to Williamson, MLF, ul.-linear circuits. Secondary 1.2, 2.5, 5, 7.5, 10, 15, 20, 30 ohms. 20 watts.



CASE	LS-1	LS-2	LS-3
Length	3⅛"	4-7/16"	5-13/16
Width	2⅜"	3½"	5"
Height	3⅛"	4-3/16"	4-11/16
Unit Wt.	3 lbs.	7.5 lbs.	15 lbs.

HIPERMALLOY series

This series provides virtually all the characteristics of the Linear Standard group in a more compact and lighter structure. The frequency response is within 1 db. from 30 to 20,000 cycles. Hipermalloy nickel iron cores and hum balanced core structures provide minimum distortion and low hum pickup. Input transformers, maximum level +10db. Circular terminal layout and top and bottom mounting.



HA-100X Shielded Input
Multiple line to 60,000 ohm grid . . . tri-alloy shielding for low hum pickup.

HA-106 Plate to Two Grids
15,000 ohms to 135,000 ohms in two sections . . . +12 db. level.

HA-113 Plate to Line
15,000 ohms to multiple line . . . +12 db. level . . . 0 DC in primary.

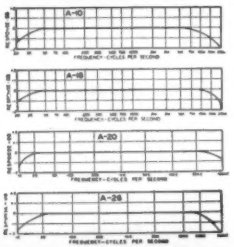
HA-133 Plate (DC) to Line
15,000 ohms to multiple line . . . +15 db. level . . . 8 ma. DC in primary.



Case	H-1	H-2
Length	2⅜"	3-9/16"
Width	1-15/16"	2-13/16
Height	3⅛"	3⅛"
Unit Weight	2 lbs.	5 lbs.

ULTRA COMPACT series

UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 2 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die cast case provides good inductive shielding. Maximum operating level is +7db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.



A-10 Line to Grid
Multiple line to 50,000 ohm grid.

A-18 Plate to Two Grids
15,000 ohms to 80,000 ohms, primary and secondary both split.

A-20 Mixing Transformer
Multiple line to multiple line for mixing mikes, lines, etc.

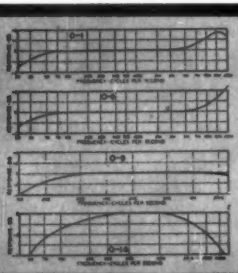
A-26 P.P. Plates to Line
30,000 ohms plate to plate, to multiple line.



A CASE	
Length	1½"
Width	1½"
Height	2"
Unit Weight	½ lb.

OUNCER series

UTC Ouncer units are ideal for portable, concealed service, and similar applications. These units are extremely compact . . . fully impregnated and sealed in a drawn housing. Most items provide frequency response within 1 db. from 30 to 20,000 cycles. Maximum operating level 0 db. These units are also available in our stock P series which provide plug-in base. The O-16 is a new line to grid transformer using two heavy gauge hipermalloy shields for high hum shielding.



O-1 Line to Grid
Primary 50, 200/250, 500/600 ohms to 50,000 ohm grid.

O-6 Plate to Two Grids
15,000 ohms to 95,000 ohms C.T.

O-9 Plate (DC) to Line
Primary 15,000 ohms, Secondary 50, 200/250, 500/600.

O-14 50: 1 Line to Grid
Primary 200 ohms, Secondary .5 megohm for mike or line to grid.



OUNCER CASE	
Diameter	⅞"
Height	1-3/16"
Unit Weight	1 oz.

WRITE FOR 1961 CATALOG

●

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HT-40 TRANSMITTER, $79.95

A perfect match for the handsome SX-140, both in quality and appearance. Hallicrafters' transmitter leadership is evident in every precision-engineered feature of this crystal-controlled 75-watt beauty—features as important to old-timers as they are to novices.

- **FEATURES:** You get excellent CW performance as well as AM. Full band switching, 80 through 6 meters. Enjoy easy tune-up and crisp, clean styling that has efficient operation as well as appearance in mind. Unit is fully metered, TVI filtered.
- **SPECIFICATIONS:** Maximum D.C. power input: 75 watts. Power output in excess of 35 watts CW, 30 watts peak AM phone. (Slightly less on 6 meters.) Frequency bands: 80, 40, 20, 15, 10 and 6 meters.
- **TUBES AND FUNCTIONS:** 6DQ5 power output; 6CX8 crystal oscillator and driver; 12AX7 speech amplifier; 6DE7 modulator; silicon high voltage rectifiers.
- **FRONT PANEL:** Function (AC off, tune, standby, AM, CW); Band Selector (80, 40, 20, 15, 10, 6); Drive control; Plate tuning, plate loading, Crystal-V.F.O.; Grid Current; Meter; AC indicator light; RF output.
- **REAR CHASSIS:** Microphone gain; antenna co-ax connector; remote control terminals; AC power cord.

SX-140 RECEIVER, $94.95

Doesn't it make sense to team up your skill with the experience of a company who has designed and built more high-performance receivers than any other in the world? Especially when the result is the *lowest-priced amateur band receiver available?*

- **FEATURES:** You get complete coverage of all amateur bands 80 through 6 meters, with extremely high sensitivity and sharp selectivity. Unit has RF stage; S-meter; antenna trimmer; and XTAL calibrator. Tuning ratio is 25 to 1.
- **CONTROLS:** Tuning; Antenna Trimmer; Cal. Reset; Function (AC off, standby, AM, CW-SSB); Band Selector; Cal. on/off; RF Gain; Auto. Noise Limiter on/off; Selectivity /BFO; Audio Gain; phone jack; S-meter Adj.
- **TUBES AND FUNCTIONS:** 6AZ8 tuned RF amplifier and crystal calibrator; 6U8 oscillator and mixer; 6BA6 1650 kc. IF amplifier and BFO; 6T8A 2nd detector, A.V.C., ANL and 1st audio; 6AW8A audio power amplifier and S-meter amplifier; (2) silicon high voltage rectifiers.

P.S. *Both units are available fully wired, and tested. SX-140, $109.95. HT-40, $99.95.*

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. . . where the new ideas in communications are born!

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COLLINS



QST

MARCH 1961

VOLUME XLV • NUMBER 3

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., WEST HARTFORD CONN., U. S. A.: OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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Subscription rate in United States and Possessions, $5.00 per year, postpaid; $5.25 in the Dominion of Canada, $6.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Second-class postage paid at Hartford, Conn., and at additional mailing offices.

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INDEXED BY
Applied Science and Technology Index
Library of Congress Catalog Card No.: 21-9421

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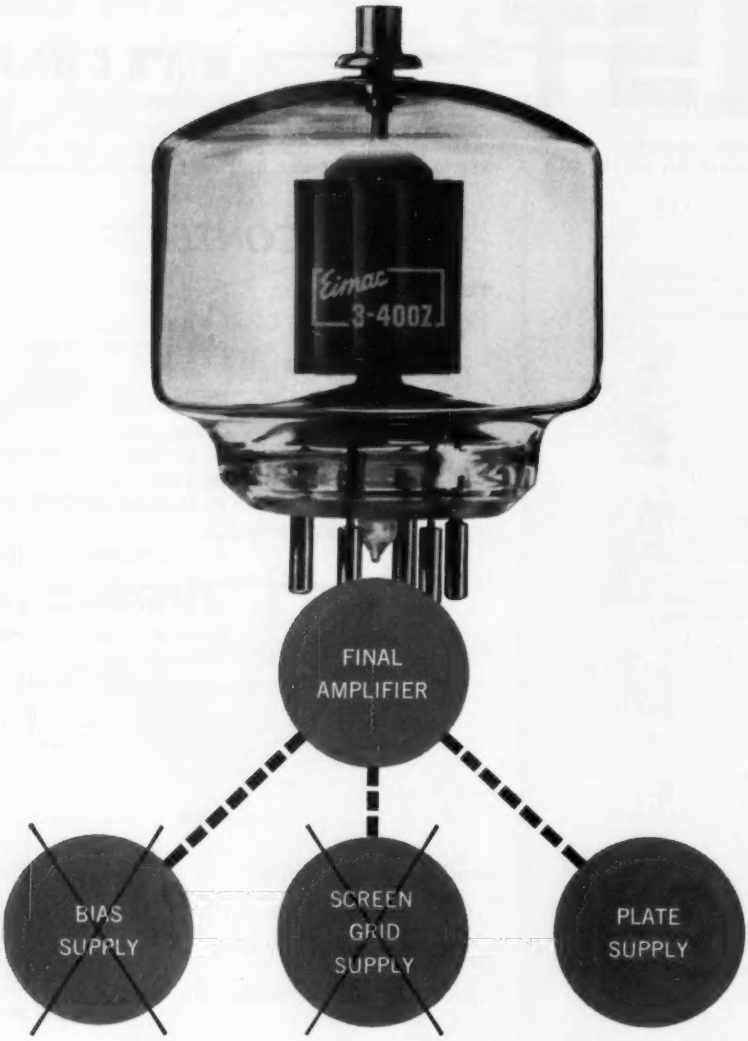
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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. OES appointment is available to Novices and Technicians.

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  - C. 2,550 cps — STANDARD FREQUENCY WIDELY USED FOR 850 CPS SHIFT
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IN CANADA: TMC (Canada) Ltd., OTTAWA, ONTARIO

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.

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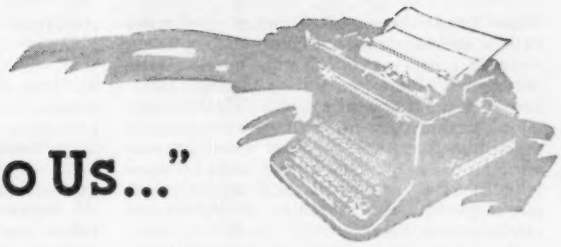
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"It Seems to Us..."

SELF-POLICING

THE early regulation of radio communication was a responsibility of the Department of Commerce. In 1923 Secretary of Commerce Herbert Hoover called a conference of U.S. radio interests to discuss various regulatory aspects including frequency allocations. The short waves had not yet been developed, and the limited spectrum was even then becoming crowded, with interference a considerable problem. Representatives of the League asked for the assignment of a certain wave band for amateurs.

"But," inquired Mr. Hoover, "how will you prevent interference?"

"Leave that to us," the League replied.

"And," Mr. Hoover recently stated, "the League has done the job."

This incident was, perhaps, the start of a tradition of amateur self-policing unique in the history of radio regulation. It is a record of which we may all be proud. It was also a necessary measure, for the growth of amateur radio was such that the Government agency could probably not justify sufficient enforcement personnel to do the policing job itself for the amateur service. Indeed, one of numerous reasons why amateur radio was not encouraged in other countries, especially in the early days, was that the monitoring and enforcement task was too monumental. Even recently, one country restricted its amateurs to voice operation, because there are not enough government monitoring personnel who know the code to keep track of any c.w. activities!

The heart of the effective accomplishment of our self-policing is the ARRL Cooperative Monitoring Service manned by Official Observers. It was inaugurated in 1926, and thousands of dedicated amateurs have volunteered their time, which would normally be spent in pleasurable operating, instead to comb the bands seeking out a bad note, or overmodulation, or clicks, or harmonics, and then dropping the offender a postcard so that he might correct the condition and avoid a "pink ticket" from FCC. There were more than 20,000 such notifications mailed by volunteer observers in 1960 — twenty thousand instances where technical discrepancies, mostly minor, were promptly caught before coming to official attention. The triple result is cleaner ham bands, much less work for FCC, and a much smaller number of amateur violations coming to official attention.

Are we today failing to live up to our tradition of competent self-policing? Are operators less courteous than they used to be? Do more amateurs today unknowingly — or openly — violate FCC regulations than ever before? Do we have a new breed of ham who has only his own pleasure in mind, who does not know enough about radio theory and practice to keep his rig within sound technical limits as to broadness, splatter, clicks, chirps and a.c. hum?

We think not — in general. But with the continuing increase in the number of amateurs, and with no increase in the number of available kilocycles, it becomes of even greater importance that we amateurs recognize our responsibility to our Government in the strict observance of rules, and our responsibility to ourselves in intelligent and courteous operating practices. The alternative is chaos.

A few amateurs feel that we are already approaching chaos, that our self-policing system is inadequate, that FCC fails to do the monitoring job it should and is lax in disciplinary measures. Let us right now assure them — and you — that the FCC monitors are right on the job. Each of numerous monitoring installations spends a certain portion of its time each day in one or more amateur bands. The personnel are capable and experienced. Many are hams themselves; thus they can use their time efficiently in checking a band or subband looking for discrepancies. FCC has been issuing amateur citations averaging more than 5500 annually for the past three years. When a citation is issued, you can be pretty sure there is a good reason for it; the motto is "if there is any doubt, don't issue the citation."

When a rules infraction is sufficiently serious, a suspension order is issued, invalidating the operator license for a certain number of months or perhaps the remainder of its term. Citations and suspension orders are part of an amateur's official record and can have a bearing on whether a license will be renewed upon expiration. And suspension orders are not as infrequent as you might suspect. They might involve operation of 75-meter phone with only a Novice or Technician

(Please turn the page)

Class license; repeated instances of splatter outside an amateur band; failure to keep a log; wilful and malicious interference to other amateurs; use of more power than the legal limit; and even the shameful act of an amateur taking an examination for license in the name of an incompetent friend. Most of these instances are reported in *QST*, as a warning to all amateurs that the Commission most certainly does discharge its responsibilities in monitoring amateur activities.

You should keep in mind, however, that FCC does not suspend or revoke an amateur license immediately upon noting a violation. Under law, the amateur has a right to defend himself against the charge as, for example, asking for a hearing on a suspension order. This has occurred several times recently in more serious cases, with the procedure often requiring many months. This may help explain the erroneous feeling of some amateurs that "FCC is not on the job" when a cited amateur continues operation; but the Commission must follow procedural rules, in protection of individual rights, and this often takes considerable time.

What is the League doing about it all? Well, remember the League is you and all your fellow hams who are members — not just the crew at West Hartford. It is our common responsibility to maintain a high standard of compliance with regulations, both in our own stations and in others, by friendly cooperation and helpful advice when another's signal is noted not up to the state of the art. There is still a great need for qualified, mature

(Continued on the facing page)

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON 25, D. C.

January 24, 1961

I have been desirous of writing the League for a long time by way of expressing my sincere appreciation in behalf of our staff at the district offices and monitoring stations for the very excellent cooperation we have had from practically the entire body of radio amateurs.

I should like to quote from a recent Commission annual report, "As with any large group the problems involved in the regulation of the amateur service are numerous. They range from international considerations, such as frequency allocation and regulations on permissible communications with foreign amateur stations, to domestic problems concerned with rules promulgation and licensing. The year by year increase in the number of amateur stations and the accelerating rate at which applications are received poses a continuing administrative problem of maintaining adequate regulation and efficient application processing. Fortunately, serious violations of the rules are few in number. This stems generally from the fact that amateurs take pride in policing their own service."

I feel sure you will be as interested as I was in an item in the Commission's Annual Report for Fiscal Year 1960 and particularly in its implications. This item reads in part as follows: "in January of 1960 the number of licensed amateur operators passed the 200,000 mark rising to some 206,000 at the year end. The number of amateur stations at that time exceeded 217,000." Thus it appears to me that it is self-evident that this very worthy program of policing their own service, which the amateurs have been pursuing diligently for the past 25 years, must continue to keep pace with the growth of their service. While the Commission is continuing its efforts to achieve more efficient usage of the amateur bands so as to accommodate all who wish to participate in amateur radio, the amateurs must in turn take note of the increasing number of stations crowding the available amateur frequencies and utilize to the fullest the facilities which they have available, particularly through their support of and the continued participation in the ARRL Cooperative Monitoring Service manned by its very effective and devoted Official Observers.

Our men at our district offices and monitoring stations who have the task of regulating through our enforcement efforts all radio services know the time and effort that your Official Observers must devote in providing this "self-service" not only in behalf of the amateur fraternity but more particularly to the brother ham in trouble. While in general the amateurs as a whole have many claims to fame and have more than justified their rightful place in the spectrum through their many acts of public service, it is this selfless and conscientious work of the Official Observers which justifies the League's claim that the amateurs are a self-regulating body.

It would please me immensely if, in behalf of our field organization, you could in some way or other express to these very faithful and trusted servants our sincere appreciation for their very valuable and worthy assistance.

Sincerely yours,

GEO. S. TURNER
Chief, Field Engineering and Monitoring Bureau

amateurs with at least three years experience to serve as Official Observers. Appointments are made by the Section Communications Manager (SCM) in each of the League's 73 sections. The name and address of your SCM can be found on page 6 of this, and every, issue of *QST*.

Perhaps the most important function we amateurs can fulfil is to make certain that newcomers are imbued with the need to observe regulations and courteous procedures. Years ago, a prospective ham either studied independently from League literature (there was little or no other) or was trained by another ham or a local radio club. Either way, newcomers were introduced early in their studies to the Amateur's Code, to the amateur tradition of self-policing, to the amateur practice of intelligent and courteous use of the spectrum. Now, a beginner may buy any one of numerous booklets by various publishers, some of which literature teaches only the minimum necessary to pass the test and avoids taking space to discuss operating principles and practices, and one's responsibility as an FCC licensee.

So all of us — and especially those called upon to be instructors in club code classes, and who are asked to serve as code examiners and witnesses to FCC tests — should make sure that newcomers realize that along with the privileges of amateur radio they also have responsibilities . . . that every one with an amateur licensee has an equal right to the air, but that there are no "reserved frequencies" . . . that there are so many amateurs today, and so many other users of radio, FCC cannot police all bands 100% of the time, and therefore we hams must look after much of our own policing . . . that, nevertheless, FCC still does apprehend and punish consistent violators . . . that if you and I operate selfishly others will too — and the end result will be bedlam. QST

COMING A.R.R.L. CONVENTIONS

March 24-25 — Michigan State, Bay City.
April 7-9 — Delta Division, Chattanooga, Tenn.
April 8-9 — New England Division, Swampscott, Mass.
April 8-9 — Southeastern Division, Orlando, Florida.
May 26-29 — Southwestern Division, Phoenix, Ariz.
August 26-27 — Central Division, Springfield, Ill.
September 15-17 — New York State, Niagara Falls.
October 13-14 — Great Lakes Division, Cleveland, Ohio.
October 13-15 — West Gulf Division. Kerrville, Texas.

MICHIGAN STATE CONVENTION

Bay City, Michigan — March 24-25

As the first ARRL convention of the convention season, the Michigan State Convention at Bay City offers a splendid program of talks, contests and entertainment. Sponsored by the Tri-County Amateur Radio Association, the affair is being held at the Wenonah Hotel, 100 Center Avenue.

Melville E. Simpson, W8EWE, is General Chairman, with Donald D. Bigelow, sr., as Secretary.

Highlights include a mobile contest, special YL activities, an ARRL forum and a Royal Order of the Wouff Hong Initiation. Lester E. Anderson, W8TXS, is chairman for the ROWH ceremonies.

Convention registration ($1.75) and information is available by writing to Michigan State Convention, P. O. Box 411, Bay City, Michigan.

Hamfest Calendar

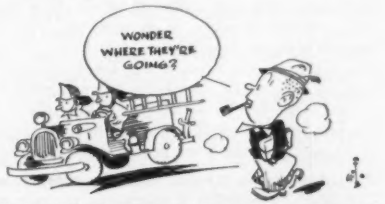
New York—The SSB Amateur Radio Association will sponsor the Tenth Annual Sideband Dinner and Hamfest on Tuesday, March 21, at the Hotel Statler-Hilton, 33rd St. and 7th Avenue, N.Y.C. All amateurs and their friends are invited. Held during the week of the IRE Convention, this dinner attracts many outstanding radio amateurs and communications men from all parts of the world. Emphasis will be placed on a large social gathering featuring good food, good fellowship and professional entertainment. There will be no formal speeches. Equipment displays open at 10 A.M. and the dinner starts at 7:30 P.M. William B. Williams, noted radio personality, will be master of ceremonies. Tickets purchased in advance are $10 each, or $11 at the door. Send checks for reservations to SSBARA, % Mike Le Vine, WA2BLH, 33 Allen Road, Rockville Centre, L.I., N.Y.

OUR COVER

Turn the page and you will get the low-down on this excellent little rig, which was built by W2YM and photographed by Frank Beaudin.

Famous Last Words

By WYMAN



"I THINK I'LL LEAVE THIS SOLDERING IRON PLUGGED IN WHILE I GO TO THE STORE. I DON'T WANT TO WAIT FOR IT TO WARM UP AGAIN."



The transmitter and power supply are separate units assembled in a frame formed from ¾-inch aluminum angle, with a single panel for the assembly. Over-all dimensions are 14½ inches high, 12¼ inches wide and 8⅜ inches deep.

A "Basic" Transmitter-Exciter With Band Switching and Power Supply

BY GEORGE D. HANCHETT,* W2YM

Compact Packaging for the 6146 Transmitter

Ham construction tends to be forced into somewhat standardized molds whose shapes and dimensions are dictated by the cabinets available. Oftentimes this sacrifices what was the principal advantage of the old rack-type construction — utilization of vertical space with a corresponding saving in "floor" area. The transmitter described here is a compact two-decker with its largest dimension vertical, and takes up very little operating-table space. Input runs 70 to 90 watts on five bands.

In the October issue of *QST* I described a v.f.o.,[1] and since then have had many requests to describe the companion transmitter. In my particular location I happen to have the fortune (or misfortune, depending upon how you look at it!) of being the neighbor of K2UAS. Because our antennas are not more than 75 feet apart, a transmitter capable of generating the cleanest possible signal is necessary in order for us both to be active at the same time. To be sure, it is impossible for us to operate on the same *band* at the same time, but it *is* possible to operate different bands without undue interference. However, the transmitter must have good shielding, the best in harmonic suppression, and high-quality keying characteristics. In addition, it is desirable that the transmitter be capable of plate modulation and that its cost be kept at a minimum. The transmitter designed to meet these requirements has been the joint effort of K2UAS and the author. At the present time one transmitter has been completed and the other is in the process of completion.

* Electron Tube Division, Radio Corporation of America, Harrison, New Jersey.

[1] Hanchett, "Stability with Simplicity," *QST*, October, 1960.

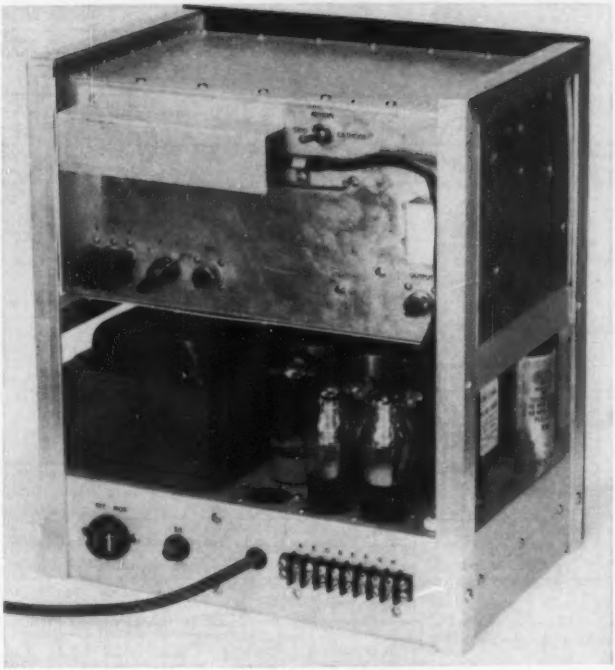
Circuit Considerations

The schematic of the transmitter is shown in Fig. 1. The tube complement was determined after considerable experimentation.

The 6EB8 is a dual tube containing a high-transconductance pentode and a general-purpose triode. The pentode unit of this tube is used as a crystal oscillator and/or multiplier; the triode unit is used only as a doubler from 7 to 14 Mc. when the transmitter is operated on 28 Mc. The major advantage of the 6EB8 is that the pentode unit requires very little drive even when operating as a multiplier. A 10-volt signal on its control grid is more than adequate for any mode of operation.

The 12BY7-A driver is operated as a frequency multiplier for all bands except 3.5 Mc. The screen-grid voltage for both the 12BY7-A and the 6EB8 is controlled by a potentiometer, R_1, to permit adjustment of the drive to the final amplifier.

The final amplifier is the old favorite 6146 with a pi-output tank circuit. The tank capacitor consists of two Hammarlund type MC-100-SX units, one of which, C_5, is used as a fixed padding



Rear view of the assembly showing the r.f. section, in its utility-box cabinet, supported by angle brackets between the fore and aft uprights of the frame. The top of the r.f. box is covered with perforated aluminum as an aid to ventilation while maintaining shielding. The wires in the power cable for the r.f. section are soldered to the feed-through capacitors of the harmonic filters (shown in Fig. 2). These terminals are covered by the bent aluminum piece at the left. A similar but smaller cover, at the right, is over the high-voltage terminal, a feed-through type insulator.

The power-supply chassis at the bottom is bolted directly to the uprights. The terminal strip on this chassis provides the connections shown in Fig. 3 for the auxiliary relay contacts and remote switch.

capacitor. For operation on the 3.5-Mc. band C_5 is automatically switched into the circuit by means of the F section of the band switch, S_2. Output loading is accomplished by use of a 140-$\mu\mu$f. variable capacitor, C_6, and nine 120-$\mu\mu$f. fixed mica capacitors. S_4, the coarse loading switch, is a Centralab 10-position progressively opening switch, type PA-2052. In the 3.5-Mc. position an extra 330-$\mu\mu$f. mica capacitor is added in parallel with the loading capacitors by section E of the band switch.

A 3-milliampere meter is used for measurement of the various currents of the transmitter and is switched into the proper circuit by S_3. Progressing clockwise, the meter measures the 6EB8 triode-unit grid current (full scale 3 ma.), the 12BY7-A grid current (full scale 3 ma.), the 6146 control-grid current (full scale 6 ma.), the 6146 screen-grid current (full scale 30 ma.), and the 6146 plate current (full scale 300 ma.).

A single-pole, double-throw toggle switch (S_5) grounds the 6146 screen grid for protection of this tube during tune-up. A double-pole, double-throw toggle switch (S_6) permits a choice of either amplifier cathode keying (used for operation with crystal control) or blocked-grid keying of the 6DT6, as previously described in the v.f.o. article.[1]

Mechanical Construction

The r.f. section of the transmitter is completely assembled in a 12 × 7 × 6-inch aluminum utility box, fitted with an aluminum subchassis which is a simple sheet of aluminum fitting snugly inside the box. As may be seen in the bottom view, two slots are cut in the bottom flanges of the utility box so that this subchassis may be inserted. The subchassis is supported by 1-inch angle brackets bolted on inside near the front and rear of the utility box, two at each end. The band switch, S_2, was assembled from Centralab's 60-degree steatite wafers and spacers. The band-switch bracket, also visible in the bottom view, serves a double function: it supports the rather long band switch, and it tends to shield the grid coil wafer from all other wafers. As can be seen in the photograph, there is also a Z-shaped shield mounted with the switch, to provide additional shielding between the low-level stages and the output circuits. This shield is formed from a scrap piece of aluminum.

Care must be exercised in the assembly of the band switch because the ceramic wafers are quite fragile. The wafer nearest to the shaft or front end of the switch, section F, is assembled with its stator contacts toward the rear and its rotor contact nearest the subchassis. Section E, the next wafer, is oriented in the same manner as F. The Z-shaped shield should be assembled next, and then section A. This wafer has its stator contacts toward the front, or panel, and its rotor contacts closest to the 6EB8 socket. Sections B and C are assembled and oriented in the same manner as section A. The support shield is next, and then section D with its stator contacts toward the rear and its rotor contact closest to

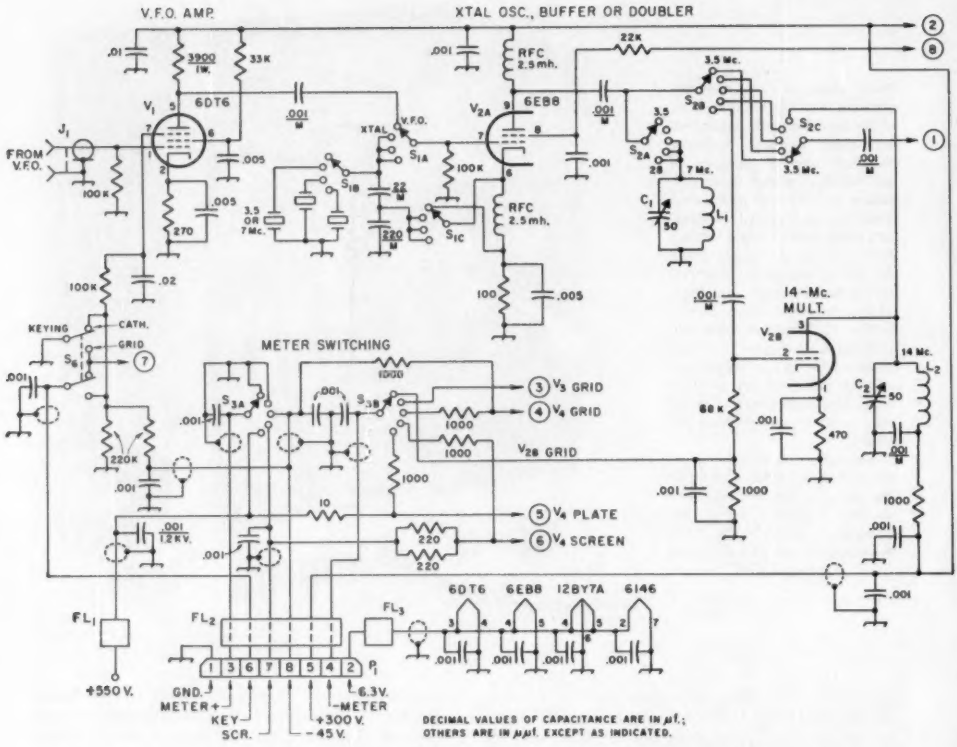
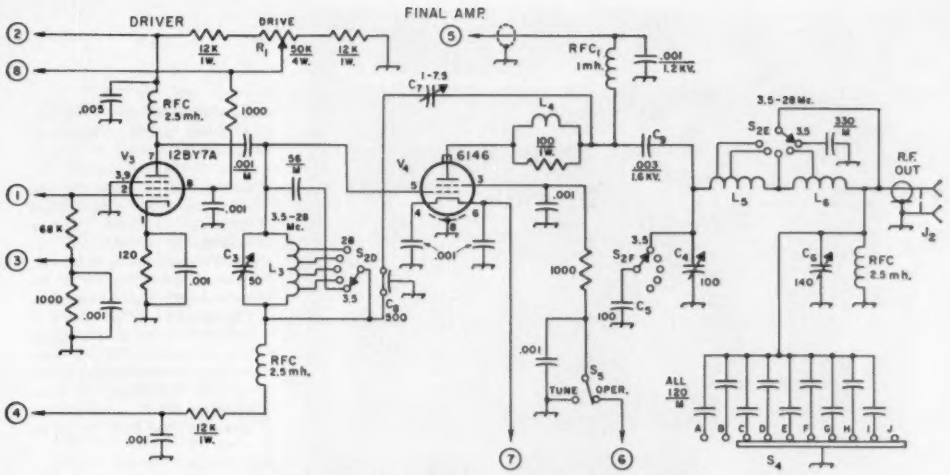


Fig. 1—Circuit diagram of the r.f. section. Except as indicated, resistors are ½-watt composition; fixed capacitors are 1000-volt disk ceramic; M = mica.

the grid bypass feed-through capacitor. The final small spacers, fiber washers, lock washers, and nuts may then be assembled. Before the switch is tightened, it should be aligned by placing it on a flat surface and then tightening the nuts. (*Caution:* Follow the manufacturer's instructions and use the fiber washers where indicated.) When making the support shield and Z shield, drill the holes for the long switch assembly screws "sloppy." A No. 25 drill is recommended. The holes in the chassis for bolting the support bracket may be spotted by temporarily assembling the switch in position. A high-quality grease on the detent will aid in smoother switch action.

The grid coil, L_3, is made from a full length of B & W 3008 coil stock and is constructed as follows: First the coil is unwound so that there is a total of 61 turns. The taps are made by cutting the coil stock a half turn beyond the desired tap point, unwinding the cut ends a half turn, and twisting them together. The twisted leads are soldered to make them as stiff as possible, and are then covered with spaghetti insulating tubing. This procedure is repeated for each tap; care should be taken to make sure that the removed turns are not counted as part of the coil. L_3 is supported on a ceramic pillar, ½ inch in diameter and 1½ inches long, which is mounted on the rear wall of the utility box.

The grid tuning capacitor, C_3, is mounted at right angles to its drive shaft so that it can be physically close to its associated coil. A right-angle drive is made by using two brass beveled gears manufactured by the Boston Gear Works. These gears (stock items No. G 462 Y) have a 3/16-inch shaft hole which must be enlarged to accommodate ¼-inch shafts. The easiest way to enlarge the hole in the gear is to do it on a lathe. If, as in my case, a lathe is not available, a very respectable job can be done by successive drilling. First the 3/16-inch hole was enlarged by drilling with a No. 11 drill, and then by successively redrilling with Nos. 9, 7, 5, 3, 1, and finally with a ¼-inch drill. Each gear is secured on its shaft with two 6-32 Allen set screws spaced 90 degrees apart. In order to obtain bridge neutralization, C_3 must be insulated from ground; small pieces of lucite were used for this purpose and the shaft was then coupled with an insulating coupling. In the 3.5-Mc. position, an additional 56-$\mu\mu$f. capacitor is automatically switched in parallel with C_3 by section *D* of the band switch.



C_1, C_2, C_3—50-$\mu\mu$f. midget variable (Hammarlund HF-50).
C_4, C_5—100-$\mu\mu$f. variable, 0.07-inch plate spacing. (C_5 used as fixed 100-$\mu\mu$f. air capacitor.
C_6—140-$\mu\mu$f. midget variable (Hammarlund HF-140).
C_7—1-7.5-$\mu\mu$f. ceramic tubular trimmer (Centralab 829-7).
C_8—500-$\mu\mu$f. feed-through, 500 volts (Centralab FT-500).
C_9—0.003-μf. ceramic, 1600 volts (Centralab DD16-302).
FL_1, FL_2, FL_3—See Fig. 2.
J_1, J_3—Coaxial connector, chassis mounting.
L_1—28 turns No. 24, ⅝-inch diam., 32 turns per inch (B & W 3008).
L_2—14 turns No. 20, ⅝-inch diam., 16 turns per inch (B & W 3007).
L_3—57 turns No. 24, ⅝-inch diam., 32 turns per inch (B & W 3008), tapped 5½, 8¼, 11½ and 28 turns from grid end.
L_4—7 turns No. 16 enam., wound on 100-ohm 1-watt composition resistor.
L_5—10 turns No. 10 enam., inside diam. 1 inch, length 2 inches; tapped 4½ and 7½ turns from plate end.
L_6—20¾ turns No. 18, 1¼-inch diam., 16 turns per inch (B & W 3019), tapped 11 turns from plate end.
P_1—Octal plug, cable mounting (Amphenol 86-PM8).
R_1—50,000 ohms, 4 watts, wire-wound (Clarostat A10-50K or Mallory M50MPK).
RFC_1—1 mh., 500 ma. (Johnson 102-752).
S_1—Ceramic rotary, 3 poles, 2-5 positions, 1 section (Centralab PA-2006).
S_2—Ceramic rotary, 6 poles, 5 positions, 6 sections (Centralab PA-17 wafers and PA-305 index assembly).
S_3—Ceramic rotary, 2 poles, 2-6 positions, 1 section, nonshorting (Centralab PA-2003).
S_4—Ceramic rotary, 1 pole, 2-10 positions, 1 section, progressive opening (Centralab PA-2052).
S_5—S.p.d.t. toggle.
S_6—D.p.d.t. toggle.

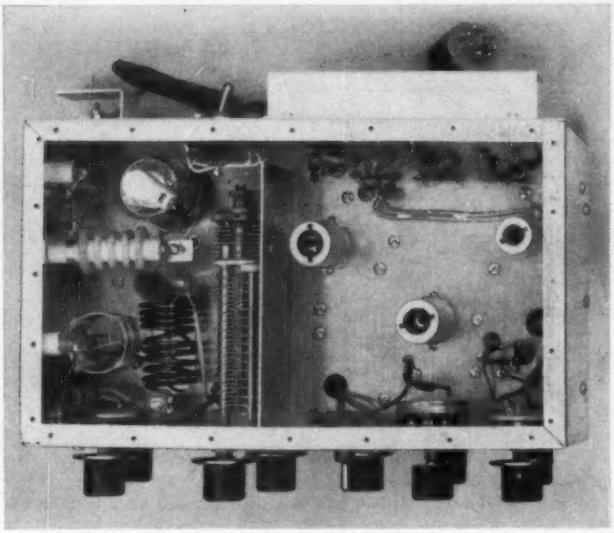
Because of the desire to have a highly stable transmitter the 6146 is bridge-neutralized, using a tubular trimmer. This trimmer is rated for 600 volts d.c., 1200 volts test, when the core is fully meshed. The 6146 neutralizes with the core approximately ½ meshed. In several transmitters constructed by the author, no failures have occurred even though during modulation the potential across these capacitors is somewhat beyond the manufacturer's working-voltage rating. This neutralizing capacitor is mounted on a small aluminum bracket affixed to the end of the pillar stand-off insulator on which the plate choke is wound. The pigtail is connected to the 500-$\mu\mu$f. feed-through capacitor, C_8, used as the grid bypass.

All leads entering or leaving the utility box are filtered and shielded. Feed-through capacitors double as terminals for the interconnecting cable and are covered with a simple aluminum hood to eliminate any possibility of a shock hazard. A perforated aluminum top cover is used to provide the necessary ventilation. Any material can be used for this cover, provided the holes are less than ¼ inch in diameter.

Power Supply

The high and low B voltages are obtained from a bridge rectifier circuit (Fig. 3) constructed on an 8 × 12 × 3-inch aluminum chassis. A used TV power transformer was utilized to minimize the cost. Any transformer supplying approximately 350 volts on each side of the center tap at about 200 milliamperes is satisfactory. Because the 5R4-GYB employs a 5-volt 2-ampere filament and all TV transformers contain a 5-volt 3-or-more-ampere winding, the bias transformer (a 6.3-volt, 1.2-ampere unit operated in reverse) is connected to this 5-volt winding. The bias voltage obtained from this supply is approximately 45 volts, just about the correct value for holding the 6146 plate current to a low value in the key-up position.

Two series-connected VR tubes regulate the 180 volts for the 6146 screen grid and the v.f.o. cathode follower. The 75 volts needed for the v.f.o. oscillator is obtained from a connection between the two VR tubes. The series resistor (R_2) is adjusted so that a current of 35 milliamperes flows through these tubes when the transmitter is in the v.f.o. and key-up condition.



Looking inside the r.f. section. A shield partition separates the final amplifier, at the left, from the driver section. The harmonic filters are at the rear right. The 3.5-Mc. tank fixed padding capacitor, C_5, is mounted on the subchassis below the tank tuning capacitor, which is just to the left of the partition; C_5 is set at maximum capacitance and no control is brought out for it. The upper row of controls, left to right, includes the final loading switch, S_4, final tank tuning, C_4, tune-operate switch, S_5, excitation control, R_1, and meter switch, S_3.

A 4-pole, double-throw relay is used to control the high and low voltages as well as to provide extra contacts for operating an external antenna relay and muting the station receiver.

Assembly

The utility box containing the r.f. section of the transmitter and the power-supply chassis are mounted one above the other in a frame made from ¾-inch aluminum angle available from local hardware stores. A false panel of ⅛-inch aluminum is affixed to the front of the aluminum frame to dress up the transmitter and give it that "commercial" look. In the unit described, the panel was sent out to a local paint shop that does industrial finishing and given a black crackle finish, after which white decal-comanias were added.

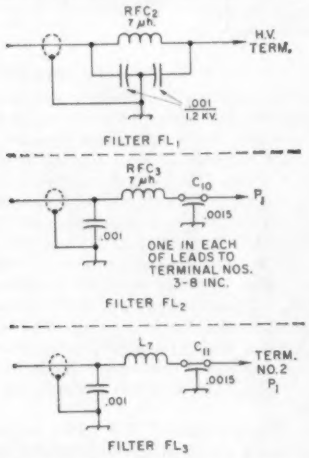


Fig. 2—Harmonic filters for power leads. Capacitors not listed below are disk ceramic.

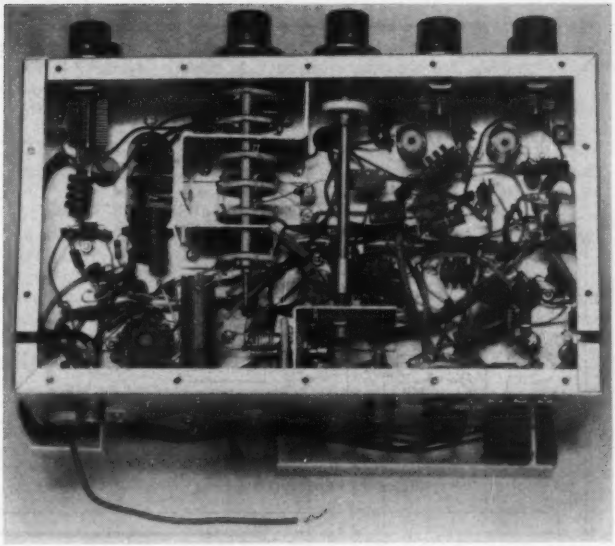
C_{10}, C_{11}—0.0015-μf. feed-through (Centralab FT-1500).
L_7—25 turns No. 16 enam., close-wound on ⅜-inch diam. plastic rod.
RFC2, RFC3—7 μh. (Ohmite Z-50).

Adjustment of Transmitter

After the wiring is completed but before the r.f.-box top and bottom covers are assembled, some basic checks and adjustments should be made.

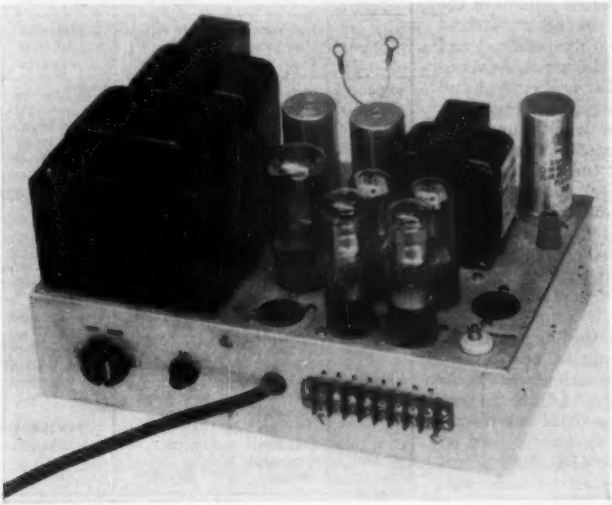
Connect the r.f. box to the power supply, but leave the 6146 high-voltage lead disconnected. Set S_5 to the tune position, S_6 in the grid-keying position, and S_1 in the v.f.o. position. Turn on the filaments and check to see if all tubes light properly. The fixed grid bias should be approximately −45 volts. Now remove the VR tubes and turn on the plate supply. The low voltage should be about 300 volts. The high voltage can be measured at the power supply and should be around 600 volts. With a high-impedance or vacuum-tube voltmeter, check to see that there is no instability in either the 6EB8 or the 12BY7A stages. This check is most readily made by measuring the grid voltage of each tube, which should, of course, be very close to zero. In the transmitter shown it was necessary to shield the grid lead to the 6EB8 pentode before complete stability could be realized.

Plug an 80-meter crystal into the transmitter and set the crystal-v.f.o. switch to correspond. With the band switch set to 80 meters, check the 6EB8 for oscillation. Again this check can be most easily made by measuring the grid voltage, which should be from 1 to 4 volts depending upon the position of the drive control, R_1.



In this bottom view of the r.f. section the panel side is at the top. Output loading capacitor C_6 is in the upper left corner. The band-switch sections, counting from the panel, are S_{2F}, *E*, *A*, *B*, *C*, and *D*. The *E* and *A* sections are separated by the shield with bent ends, and the *C* and *D* sections have a straight shield between them. C_3 is at bottom center, mounted on a plastic plate on the L-shaped bracket, to insulate it from chassis. This capacitor is turned through the right-angle drive (the shaft for this is also insulated from the bracket) described in the text. C_1 and C_2 with their associated coils, L_1 and L_2, are at the upper right.

The v.f.o. should now be connected, the VR tubes replaced, and R_2 in the power supply adjusted so that a current of 35 milliamperes is flowing through the 0C3 regulator tube with the transmitter in the key-up position. Close the key and check the drive on the 6EB8; it should be approximately 1 volt. The 6146 grid tuning can now be resonated for maximum grid current, and the R_1 drive control set to develop a current of 3 milliamperes. With a wavemeter, or a grid-dip meter in the diode position, check to see that the grid circuit is on 80 meters. Next, turn the plate power off and advance the band switch to the 40-meter position and repeat the tuning procedure. Again, turn the power switch off and advance the band switch to the 20-meter position. On this band, the buffer tuned circuit is automatically switched into the circuit; therefore, it will be necessary to adjust C_1L_1 to 7 Mc. before proceeding. This adjustment is made by setting the meter switch to the buffer (second) position and adjusting for maximum grid current. L_1C_1 should be checked to be sure the circuit is tuned to 7 Mc. The meter switch may then be advanced to the 6146 grid (third) position and the grid tuning adjusted for maximum grid cur-



Power-supply chassis. Any layout that will fit the components into the available chassis space may be used. Here the power transformer and high-voltage choke are at the left, the high-voltage filter capacitors are at the rear center, and the low-voltage choke and capacitor are at the rear right. Rectifier and voltage-regulator tubes are grouped in the center foreground. The two octal sockets are power outlets to the transmitter and v.f.o. The feed-through in the near right corner is the high-voltage terminal, and should be covered with an insulating sleeve after the lead that goes to the transmitter is attached. The bias-supply components are underneath the chassis.

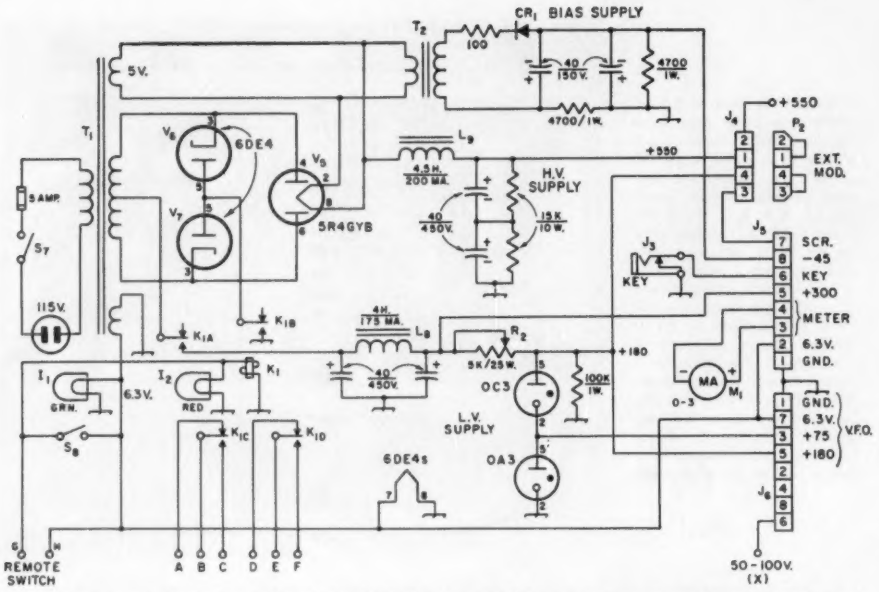


Fig. 3—Power-supply circuit. See article on v.f.o. (QST, October, 1960) for explanation of terminal marked X. Capacitances are in μf., capacitors are electrolytic.

CR_1—65-ma., 130-volt selenium.
I_1, I_2—6.3-volt pilot lamps.
J_3—Closed-circuit phone jack.
J_4—4-prong socket.
J_5, J_6—Octal socket.
K_1—4 poles, double throw, 6-volt a.c. coil (Potter & Brumfield GA-17A).
L_8—4 henrys at 175 ma. d.c. (Stancor C-1410).
L_9—4.5 henrys at 200 ma. d.c. (Stancor C-1411).
M_1—0-3 d.c. milliammeter.
P_2—4-prong male plug (Amphenol 86-CP4).
R_2—5000 ohms, 25 watts, with slider.
S_7, S_8—S.p.s.t. toggle.
T_1—Power transformer; approx. 700 volts c.t., 200 ma. min.; 5 volts, 3 amp.; 6.3 volts, 7.5 amp. min. (salvaged from old TV receiver).
T_2—Filament, 6.3 volts, 1.2 amp. (Stancor P-6134).

rent. Check to be sure the grid circuit is at 14 Mc. The same procedure is repeated for 21 Mc.

The transmitter may now be checked for 10-meter operation, where the triode section of the 6EB8 is called into play. Set the meter switch to read multiplier grid current (first position) and adjust C_1L_1 for maximum grid current. Advance the meter switch to read buffer grid current and adjust C_2L_2 for maximum current. At this point C_2L_2 should be checked to see that it is operating on 14 Mc. Now advance the meter switch to read 6146 grid current and adjust the grid tuning for maximum grid current. A check should be made to be sure the grid circuit is at 28 Mc.

The neutralizing of the 6146 is performed at 28 Mc. Adjust the drive to the 6146 to 3 milliamperes, and set the output loading capacitor, C_6, at about mid-position and the loading switch to position "G." Temporarily couple a wavemeter or grid-dip meter to the output of the transmitter. This coupling can be best accomplished by utilizing a short length of coax cable and a temporary one-turn link. Adjust the amplifier tuning capacitor, C_4, and the wavemeter to obtain a reading. If the wavemeter goes off scale, reduce the drive to the 6146. Now adjust the neutralizing capacitor, C_7, for minimum out-

Typical Voltages and Currents

Tube		Key Up	Key Down
	Low Voltage	300 volts	300 volts
	High Voltage	600 volts	540 volts
	Bias	−45 volts	−45 volts
6EB8 (Pentode)	Plate current	5.0 to 8.0 ma.	4.0 to 9.0 ma.
	Screen-grid voltage	30 to 50 volts	30 to 50 volts
	Grid drive	0	1 to 2 volts
	Cathode voltage	0.7 to 1.1 volts	0.6 to 1.3 volts
6EB8 (Triode)	Plate current	4.8 ma.	4.0 ma.
	Grid drive	0	0.8 ma.
	Cathode voltage	2.2 volts	2.2 volts
12BY7-A	Plate current	10 to 14 ma.	8 to 11 ma.
	Screen-grid voltage	46 to 90 volts	46 to 90 volts
	Grid drive	0	0.15 to 1.1 ma.
	Cathode voltage	1.3 to 1.65 volts	1.0 to 1.5 volts
6146	Plate current	15 to 20 ma.	125 ma.
	Screen-grid current	0	7 to 10 ma.
	Grid drive	0	3 ma.
	Screen-grid voltage	180 volts	180 volts

put as read on the wavemeter. This adjustment completes the neutralizing procedure, and the setting of C_7 should not have to be touched unless the 6146 is replaced. The temporary connections to the wavemeter may now be removed.

To test the final amplifier, a 50- to 75-ohm dummy load will be needed. A suitable load can be constructed from twenty 2-watt, 1000-ohm composition resistors connected in parallel. Connect the high voltage to the 6146 and turn the plate power on. With S_5 in the tune position, approximately 15 to 20 milliamperes of plate current will be evident. Rotate the plate tuning capacitor until there is a noticeable dip in this current. S_5 may now be switched to the operate position and the loading successively increased or decreased until the plate current is 125 milliamperes. This process should be repeated for each band and the approximate dial settings of all controls noted.

The top and bottom plates can now be bolted into place and the transmitter assembled in its frame. However, before the top and bottom plates are put on it would be well to set each variable capacitor to half scale since it will be impossible to determine the positions of the capacitor rotors after the top and bottom plates are in position.

The transmitter may be coupled into any antenna system that presents a 50- to 75-ohm load for the transmitter. An antenna tuner similar to the ones described in the *ARRL Handbook* is used by the author. QST

• New Apparatus

Cesco Mobile Products

THE photograph shows a series of mobile accessories manufactured by the Continental Electronics & Sound Co., Dayton, Ohio. It includes from left to right, a generator noise filter, dummy antenna, and two antenna connector adapters.



The generator noise filter comes in two models, one for the frequency range of 30 to 60 Mc., and the other for 3 to 30 Mc. The low-frequency unit is rated at 25 amperes and the high-frequency model, 20 amperes. A mica trimmer capacitor is wired across the heavy conductor coil and, after the filter is installed, is tuned for minimum generator interference. A cast-aluminum bracket mounts the filter to the generator. Electrical connections to the filter are made to threaded studs at each end of the coil.

The dummy antenna, called a CB Phantom Load, is a 52-ohm noninductive load for use with any transmitter with an input not exceeding 5 watts. An 83-1SP u.h.f. series connector is at one end of the load for attaching directly to the transmitter's output connector.

A series of two connector adapters is available — a type SC, at the far right in the photograph, and a type CS. The SC plugs into the u.h.f. series chassis-type connector (SO-239) and will take a Motorola-type automobile antenna plug. The model CX combines a Motorola jack with a PL-259-coax plug.—E. L. C.

Strays

CALLING ALL . . .

K8PMM wants to get in touch with any other amateur who is also employed by a sanitation department. He lives at 3242 Aerial Ave., Kettering, 29, Ohio.

—···—

W8YHO (1368 Roslyn Ave., Akron 20, Ohio) wants to get in touch with U.S. or Canadian amateurs who originally hailed from the British Isles. Send him your present call and QTH, your ex-G call (if any), and your ex-G QTH.

—···—

W7ETK (4222 South 172nd St., Seattle 88, Wash.) wants to hear from all amateurs who are also aeroplane pilots. Send him your name, QTH, and call, what class ham ticket you have, and class of pilot's license.

—···—

VE3DSG (1141 St. Clair Ave. W., Toronto 10, Ontario) wants to hear from hams who not only fly their own planes but are also funeral directors.

—···—

K4VPU is attempting to compile a directory of active and inactive AACS personnel. Send the dope on call letters, time and place of service, etc., to C. E. Mason, RFD 1, Box 658, Warner Robins, Georgia.

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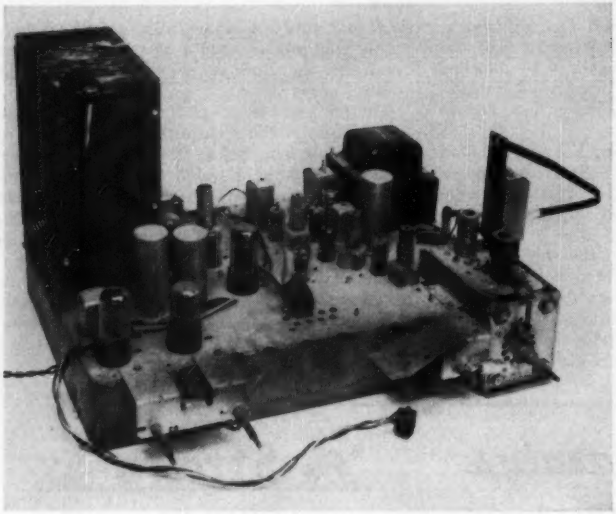
W5TVN suggests that all Methodist hams join the World Association of Methodist Radio Operators, whose headquarters is at 75 Park Road, Mansfield Woodhouse, Nottinghamshire, England.

—···—

If you're an airline ham, W7PZ and W7AKX want you to tune up 61 kc. inside the low end of any phone or c.w. band and call "CQ JET," at noon or midnight, EST. This would be 0500 or 1700 GMT. Why 61 kc.? This is 1961!

—···—

W3UIU wonders if he is the only ORS who is a pharmacist. Others please contact him at 131 Race St., Sunbury, Pa.



Those of you who know Lew McCoy personally realize that he is a man of many talents. High on the list is his ability as a sleight-of-hand artist—he can make cards and coins appear and disappear with the greatest of ease. He certainly displayed some of his skill as a magician when he took the broken down old TV set pictured at the left and after suitable manipulations came up with the very handsome little transmitter shown on the next page. In this article Mac shows you how you can perform this same magic and come up with a nifty transmitter of modern design and low cost.

• *Beginner and Novice*

65 Watts at Low Cost

Discarded TV Set as a Component Source

BY LEWIS G. McCOY,* W1ICP

BUILDING a 65-watt multiband transmitter for about twenty dollars sounds a little ridiculous in these days of high prices. However, with a little judicious scrounging it is no problem at all. The transmitter described in this article was built for the most part from a junked TV set. TV sets from the 1948 to 1955 era have been "wearing out" and accumulating in TV repair shops. Investigation proved that these sets can usually be obtained for the asking or for a very slight charge. The TV shops are usually glad to get rid of them.

For our purposes the TV set doesn't have to be in working order as long as it has a usable power transformer (some models didn't use transformers). When acquiring the TV set, make sure the power transformer isn't burned out. All you have to do is smell the transformer — if it's bad you will be able to tell by the odor of burnt insulation. Also, if the set has the tubes in it, check to see if it has a 6K6 and a 6BG6; these are the tubes you'll need for the rig. Or you might ask the TV man if he has some "old" 6K6s and 6BG6s. You'll probably find he has a collection of them taken from old sets and will be glad to let you have a few cheap (this was true in our case). You might as well take advantage of a good thing and also try to promote a tuning capacitor from an old a.c.-d.c. table radio.

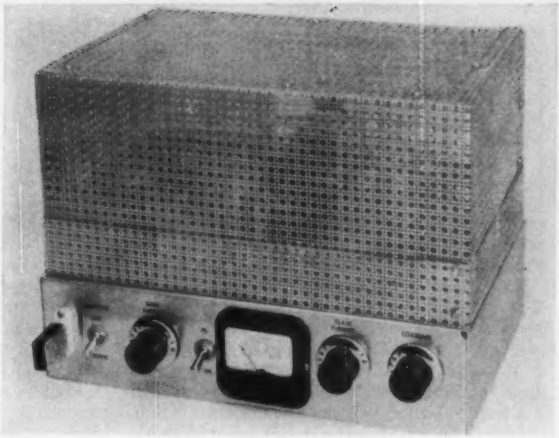
* Technical Assistant, *QST*.

C_5 in Fig. 1, the tank capacitor of the final amplifier, is such a capacitor. Also, some of the old TV sets didn't have power-supply chokes, using the speaker field winding instead, and this won't serve our purposes. Therefore, try to get a set with a choke in it. Practically any TV set with a transformer power supply will do, but if you can, try for an RCA chassis. The transformers in these sets give slightly more voltage than some of the other types.

Circuit Details of the Transmitter

The transmitter can be operated on any band from 3.5 Mc. through 28 Mc. at inputs up to 70 watts, depending on the plate voltage of the amplifier. A 6K6 crystal-controlled oscillator is used. The input side of the tube operates at the crystal frequency, while the output side can be tuned either to the crystal frequency or multiples of it. In other words, the 6K6 operates as a combination oscillator and frequency multiplier. L_1L_2, with C_3, serves as the oscillator tank circuit.

Either 80- or 40-meter crystals can be used, depending on the band. For 80-meter work, a 3.5-Mc. crystal is used. For 80, L_1 is the tank coil and L_2 is not required for this band. The same crystal will furnish adequate drive on 40, with the oscillator doubling, and on 20 with the oscillator quadrupling. Alternatively, a 40-meter crystal can be used for 7 Mc., or for 14 Mc. with



This is a view of the completed transmitter, the one that McCoy created by waving a magic wand (soldering iron, that is) over the broken-down old relic shown on the opposite page. (Oh, sure—he had to buy a few extra parts.) At the far left on the chassis front is the crystal and to its right are S_1, C_3, and S_2 in that order. The amplifier tank and loading capacitor controls are to the right of the meter.

the oscillator doubling. A 40-meter crystal is used for 21 Mc. with the oscillator tripling, and for 28 Mc. with the oscillator doubling to 14 Mc. and the amplifier doubling to 28 Mc.

The amplifier tank circuit is a pi network designed to work into 50- or 70-ohm loads. The tank capacitor, C_8, is a two-section superhet variable. One section has a maximum capacitance of approximately 170 $\mu\mu$f., and the other section 430 $\mu\mu$f. Both of these sections are connected in parallel when the 80-meter coil is plugged into the coil socket. For 40 meters, only the 430-$\mu\mu$f. section is used, and on 20, 15, and 10, just the 170-$\mu\mu$f. section. A three-section t.r.f.-type variable capacitor, C_7, with all three sections connected in parallel, is used for the pi

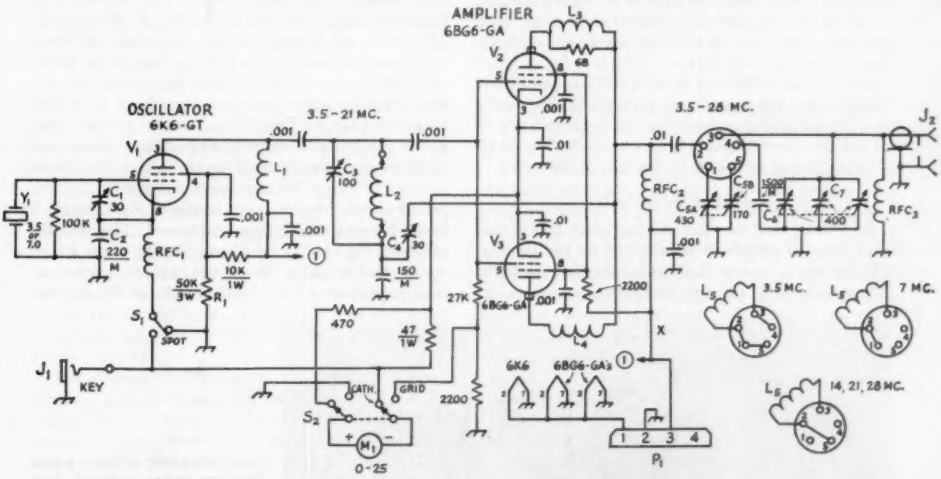


Fig. 1—Circuit diagram of the transmitter. Unless otherwise indicated, capacitances are in $\mu\mu$f., resistances are in ohms, resistors are ½ watt. Fixed capacitors marked M are mica; others are disk ceramic.

C_1, C_4—3-30-$\mu\mu$f. mica trimmer.
C_2—220-$\mu\mu$f. mica.
C_3—100-$\mu\mu$f. variable (Hammarlund HF-100).
C_5—Two-section receiving variable, approx. 170 $\mu\mu$f. and 430 $\mu\mu$f. (Allied Radio 61-H-065 or Philmore 9045).
C_6—1500-$\mu\mu$f. mica.
C_7—Three-section receiving variable, approx. 400-$\mu\mu$f. per section (Allied Radio 60-H-726 or Philmore 9047).
J_1—Open-circuit phone jack.
J_2—Coax chassis receptacle, SO-239 or phono jack.
L_1—25-μh. r.f. choke (Millen 34300-25).
L_3, L_4—3 turns No. 14 wound on a 68-ohm 1-watt resistor. These are parasitic suppressors, and they are both connected as shown at L_3. The 68-ohm resistor was omitted at L_4 in the drawing to save space.
M_1—0-25 milliammeter (Shurite Model 950 or 550).
P_1—Four-prong plug, cable mounting (Amphenol 86PM4).
R_1—50,000 ohms, 3 watts (three 150,000-ohm 1-watt resistors in parallel).
RFC_1, RFC_2, RFC_3—1-mh. r.f. choke (Millen 34300-1000).
S_1—S.p.d.t. toggle.
S_2—D.p.d.t. toggle.
Y_1—3.5- or 7.0-Mc. crystal, as required.

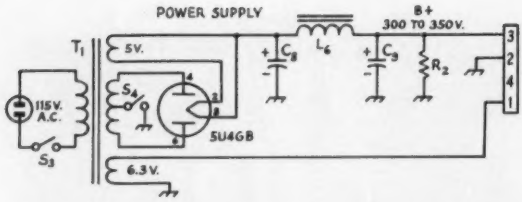


Fig. 2—Circuit diagram of typical power supply. See text for values.
J_3—Four-prong socket.
S_3, S_4—S.p.s.t. toggle.

loading control. In addition, a fixed 1500-$\mu\mu$f. mica, C_6, is connected into the circuit when the 80-meter coil is plugged into the coil socket.

The amplifier is neutralized to prevent self-oscillation. A capacitive-divider neutralizing system consisting of C_4 and the 150-$\mu\mu$f. mica capacitor is the neutralizing circuit. RFC_3 serves as a safety precaution in the event that the plate blocking capacitor should break down, in which case the d.c. +B would be on the antenna system if the r.f. choke were not there to short-circuit it.

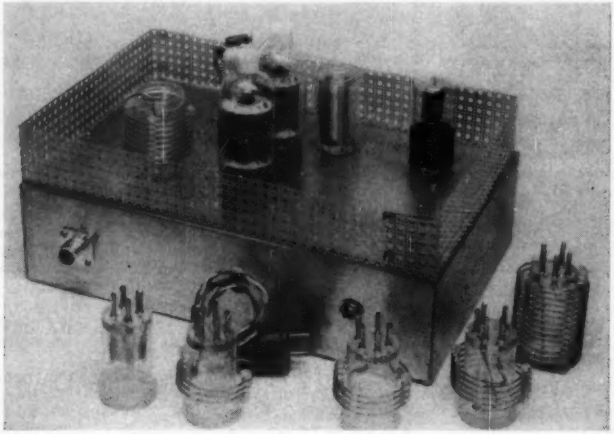
Cathode keying is used in the transmitter. Both stages can be keyed or just the amplifier. Better keying results if the oscillator is left running and the amplifier alone is keyed. This is taken care of by grounding the cathode of the oscillator with S_1. (If amplifier keying is used, the oscillator must be turned off with S_1 when receiving, otherwise the oscillator signal will be heard in the receiver.) S_1 can also be used as a spotting switch to turn on the oscillator without turning on the amplifier.

A 0–25 milliammeter is used to measure either the grid current or cathode current of the amplifier. In the grid position, the full-scale reading is 25 ma. In the cathode position, a multiplier of 10 is used, giving full-scale deflection of 250 ma.

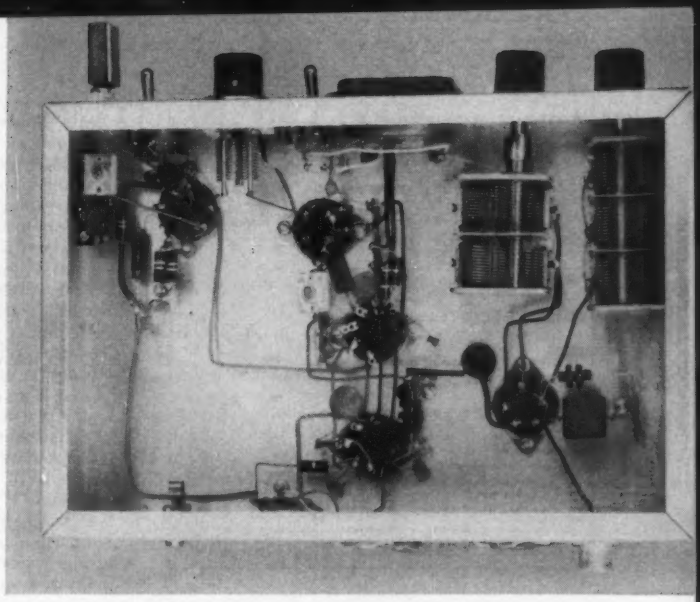
Power Supply

If you'll look at the photographs you'll see that there is no power supply shown for the rig. The answer is simply that you don't have to build a supply — the TV set already has one in it! If you don't mind having the supply on the TV chassis, it is quite simple to make use of the already-constructed supply. All the tubes except the rectifier should be removed from the TV set and three leads are brought from the set to the transmitter. A ground lead is required, a lead from the 6.3-volt heater line, and the +B lead. The easiest method for getting the +B lead is to ask the TV serviceman to show you where the +B comes out of the power-supply filter. Otherwise you'll have to trace out the wiring to find the point where the +B leaves the last electrolytic filter capacitor.

If you want to strip the TV set down, you can get another chassis and build yourself a supply. Fig. 2 shows the circuit of a supply that will do the job. This is a capacitor-input supply of the same type used in the TV set. Upon examining the TV set, you'll find several electrolytic capacitors, usually in metal cans. The values will probably range from 8 μf. to 40 μf. or more at 450 volts, depending on the set. Any of these values can be used for C_8 and C_9, but if two different values are available, use the larger for C_9. However, be sure you use capacitors with the 450-volt rating. You'll find some values with much lower working-voltage ratings; these capacitors are usually used in audio circuits where a high working voltage isn't required. L_6, the power-supply choke, may range in value from 2 to 10 henrys, depending on the set. The bleeder resistor, R_2, should be about 50,000 ohms at 10 watts. Incidentally, the metal can of the electrolytic capacitor is the negative side of the capaci-



Here is a shot of the rig with the top screen removed. L_2 is visible between the oscillator tube (at the right) and the amplifier tubes. The amplifier coil is at the left. Along the back of the chassis from the left are the output jack, power cable, and key jack.



The oscillator components are grouped around the 6K6 socket visible at the upper left. Just below the toggle switch next to the meter is the coil socket for L_2. The two 6BG6 sockets are at the center of the chassis. The two section variable capacitor at the upper right is C_5 and C_7 is to its right. Just below the two variables is the coil socket for L_5. To the right of the socket are C_6 and RFC_3.

tor. Be sure you observe correct polarity when installing the capacitors in the supply. The B plus can be turned on and off with S_4.

Construction Details

A 3 × 8 × 12-inch aluminum chassis is used for the transmitter. Follow the general arrangement shown in the top and bottom views when mounting the components in place. C_3 must be insulated from the chassis and fiber washers are used for this purpose. Be sure to allow sufficient room between C_5 and C_7. (The writer goofed on this score and had the two rotors striking each other when they were tuned near minimum capacitance!)

If you live in an area where TVI is a problem, you'll have to shield the rig. The top shield in the unit shown was made from a section of Reynolds' "do-it-yourself" perforated aluminum stock. Incidentally, we found this was the most expensive item in the transmitter, costing about three dollars!

The "fence" that runs around the top of the chassis is made from two sections of perforated stock, 2 inches wide and 21 inches long. The perforated stock comes in a 36 × 36-inch piece, so it is impossible to get a single length long enough to go around the entire chassis. The completed fence is 1¾ inches high with a ¼-inch lip which is secured to the chassis top with machine screws and nuts. The two sections are each formed into an L shape measuring 8 × 12 inches, the remaining inch being used at two of the corners for an overlap to fasten the two sections together with screws and nuts.

The sides of the shield are made from two pieces of perforated stock measuring 6½ × 20½ inches before folding. The side dimensions of the two pieces after folding are 7¾ and 11¾ inches; the extra inch is used for the overlap to connect the two pieces together. A one-inch flange is folded in around the top so that the overall height is 5½ inches. The top is made from a piece of stock 7¾ by 11¾ inches and is secured to the sides with machine screws and nuts. When the completed cover is slid down inside the fence and flush with chassis, the overlap is sufficient to prevent harmonic leakage, provided care has been used in folding the stock to insure a snug fit. No screws are needed to hold the cover down. This makes coil changing a simple chore because the cover can be removed and replaced quite easily.

The cable used to connect the transmitter to the power supply can be made any length, depending where you install the power supply.

Making the Coils

Table I gives all the necessary information on the plug-in coils. The coils are made from commercially wound coil stock, so making the coils is a fairly simple job. The oscillator coils are mounted inside the plug-in coil forms and the amplifier coils are on the outsides of the forms. The Air Dux coil stock specified in Table I has exactly the right diameter to fit over the forms.

When cutting the oscillator coils from the original stock, allow three extra turns on the 20–15-meter coil and five extra turns for the 40-meter unit. When these extra turns are unwound from the coil stock you'll have sufficient lead length to reach through the prongs on the plug-in coil forms. Before soldering the prongs, take a file and file off the nickel plating from the ends of the prongs, so that the solder will take more readily. Also, hold the prong being soldered with a pair of pliers to prevent too much heat from reaching the base of the coil form and loosening the prong. Be sure to clean off any resin that may stick to the prongs after soldering. Use four-prong coils for the oscillator coils and five prongs

TABLE I

Plug-In Coil Data

L_2 —	7 Mc. — 29½ turns No. 20, 16 turns per inch, ¾-inch diam. 14–21 Mc. — 7½ turns same (B & W Miniductor 3011 or Illumitronic Air Dux 616T).
L_5 —	3.5 Mc. — 13 turns No. 14, 6 turns per inch, 1¾-inch diam. 7 Mc. — 8 turns same. 14 Mc. — 5 turns same. 21 Mc. — 3½ turns same. 28 Mc. — 2½ turns same. (Illumitronic Air Dux 1406T).

Note: A single length of Illumitronic 616T or B & W 3011 will suffice for the 7- and 14–21-Mc. oscillator coils. One length of Air Dux 1406T is sufficient for all the amplifier coils. The L_2 coils are mounted in four-prong plug-in coil forms, 2 required (Amphenol 24-4P or Allied Radio 71-H-713), and the L_5 coils in five-prong forms, 5 required (Amphenol 24-5H or Allied Radio 71-H-714).

for the amplifier.

When making the amplifier coils, jumper the prongs as shown in Fig. 1.

Tuning Up the Rig

The first step in testing is to neutralize the final amplifier. The lead that feeds the plates and screens of the 6BG6s should be disconnected at point X in Fig. 1 so that the only voltage on these tubes is the heater voltage. Plug in a 40-meter crystal and the 40-meter grid and plate coils. Turn on the power and let the oscillator tube warm up. Switch S_2 to read grid current. Next, close the key and adjust C_3 for a grid-current reading of 4 to 5 ma. Set C_7 at maximum capacitance (plates fully meshed) and then tune C_5 through its range. At one point you should notice a dip in the meter reading. Next, carefully adjust the neutralizing capacitor C_4 so that the *least* amount of change occurs in the meter reading when C_5 is tuned. When you find this point, the amplifier should be neutralized. In the rig shown here, this point was near the maximum-capacitance setting of C_4. The plate and screen leads may now be reconnected — *remembering* to turn off the power *first*.

A dummy load should be used for testing the amplifier, and a good one for this purpose is a 60-watt lamp bulb. Connect a lead from J_2 to the center contact on the base of the bulb and another lead from chassis ground to the threaded portion of the lamp base.

Plug in an 80-meter crystal and the 80-meter coil, turn on the power, and let the transmitter warm up. Set both C_5 and C_7 at maximum capacitance, plates fully meshed. Switch S_2 to read grid current and close the key. Tune C_3 for a grid-current reading of 2 to 4 ma. Don't hold the key down any longer than it takes to tune up for grid current, as the final will be out of resonance and will draw excessive plate current. This could cause permanent damage to the tubes. Next, switch S_2 to read cathode current and close the key again. Tune C_5 for a dip in the meter reading; this will indicate that the final is tuned to resonance. Start decreasing the capacitance of C_7 while keeping the amplifier in resonance (at the dip in the meter reading) by adjusting C_5. The light bulb should start to light up and get brighter as you adjust C_5 and C_7. The 6BG6s are good for 100 ma. per tube, so you can load the amplifier to about 200 ma. Our TV set gave a plate voltage of 320 under a load of 200 ma., which amounts to 64 watts input.

The same tune-up procedure should be followed for the other bands. When tuning up on 20 and 15 there are two settings of C_3 which will give you grid drive to the final, depending on which band you want. The setting nearest maximum capacitance is 20 meters and the one near minimum is 15. One way to check the correct tuning points is with an absorption wavemeter. In fact, an absorption-type wavemeter is almost a "must" in any ham shack, particularly a Novice's. The wavemeter will show you what band your transmitter is tuned to. Details for simple wavemeters can be found in the Measurements chapter of *The Radio Amateur's Handbook*.

The feedback capacitor, C_1, in the oscillator circuit should be adjusted with the rig tuned up for 15 meters. Adjust C_1 for a grid-meter reading of no more than 4 ma. on this band. This adjustment need not be changed for other bands with crystals of ordinary activity.

With the TV set we used, the plate voltage on the 6K6 was 320 volts, the screen, 250. Screen voltage of the 6BG6s was 300 volts. In order to get the 100-ma. plate current per 6BG6 the screen voltage should be approximately 300 volts.

After you've checked the rig out with a dummy load you are ready to put the transmitter on the air. If you don't already have an antenna and antenna coupler, the *Handbook* will give you information on different types of both.

Any antenna system, or antenna-plus-coupler combination, that can be adjusted to offer a load of about 50–75 ohms can be used with this transmitter. QST

Strays

W6SYA has received the Distinguished Civilian Service Award from the Navy Department for his work in developing and operating an iceberg-detector sonar used on board an atomic submarine. He is a civilian employee of the U.S. Navy Electronics Laboratory at San Diego.

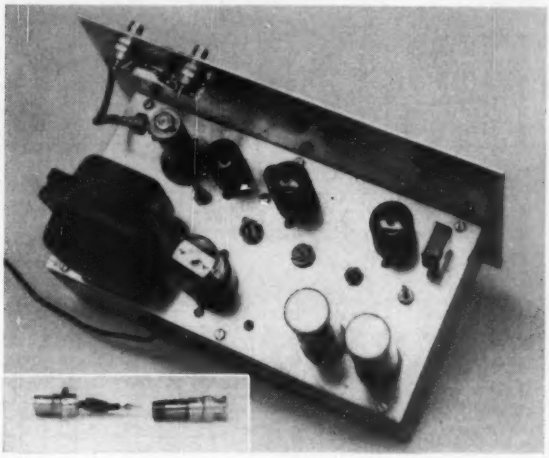
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Congratulations to two hams recently named Fellows of the Institute of the Radio Engineers — WØTTK who was chosen for his work in advancing single sideband radio communications, and W2DOG for contributions to experimental wave propagation research.

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Dr. Lloyd V. Berkner, president of Associated Universities and ex-9AWM, has been elected president of IRE for 1961.

New Methods for Checking V.H.F.-U.H.F. Receiver Performance



Top rear view of the signal generator. Output jacks J_1 and J_2 and the built-in attenuator are mounted on the panel in the upper left corner. From them, a short length of coax runs to the coaxial tank, L_5. On a line with it from left to right are the 6AK5, the 12AT7s, and the crystal. The test point is just visible to the left of the middle tube. On a line behind the tubes are the tuning screws for C_2, L_4, L_3, L_2 and L_1. Toward the rear of the chassis are the power transformer, the 6X5 rectifier tube and filter capacitors C_4 and C_5. The inset shows the external attenuator with P_1 on the right and P_2 on the left.

A Pulsed, Crystal-Controlled Signal Generator

BY ROBERT L. McFARLAND,*

With this generator and an oscilloscope you can adjust your receiver and actually watch what happens to its gain and signal-to-noise ratio. Though described for 436 Mc., the method can be used at any other frequency.

In connection with a radio-telescope project on which the writer has been working for several months, it became necessary to devise a simple means of checking antennas and receivers at 436 Mc. After struggling for some time with an expensive commercial signal generator which drifted in frequency, it was decided to build a crystal-controlled generator. Further thought established that if the generator were pulsed, an oscilloscope could be used to view the output of the receiver, and the scope display would look very much like a type "A" radar presentation. This display (see Fig. 1) shows the effect of any adjustment which changes the signal amplitude or affects the signal-to-noise ratio.

The generator described here was sketched out and built in less than a day, and it was intended to use as few parts and be as inexpensive as possible. Although this unit was designed for output at 436 Mc., the pulsing method could be used with an r.f. system for any other band. A perfectly satisfactory crystal turned out to be one of the radio control crystals for use at 27.25 Mc. and selling for less than $3.00. As shown in Fig. 2, four doublers bring the frequency up to 436 Mc., with sufficient power to make antenna pattern measurements. One 12AT7 serves as oscillator and first doubler. The capacitor across L_1, the oscillator plate coil, is required to raise the tank Q enough for third overtone operation of the crystal on its marked frequency. Another 12AT7 provides two more frequency doublers. These are followed by a 6AK5 doubler with a coaxial output tank. The latter gave better efficiency than any of the coil-capacitor arrange-

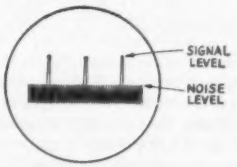


Fig. 1—Receiver output as seen on an oscilloscope. Height of signal pulses above the noise "grass" indicates the signal-to-noise ratio.

*3720 Dewsbury Road, Winston-Salem, N. C.

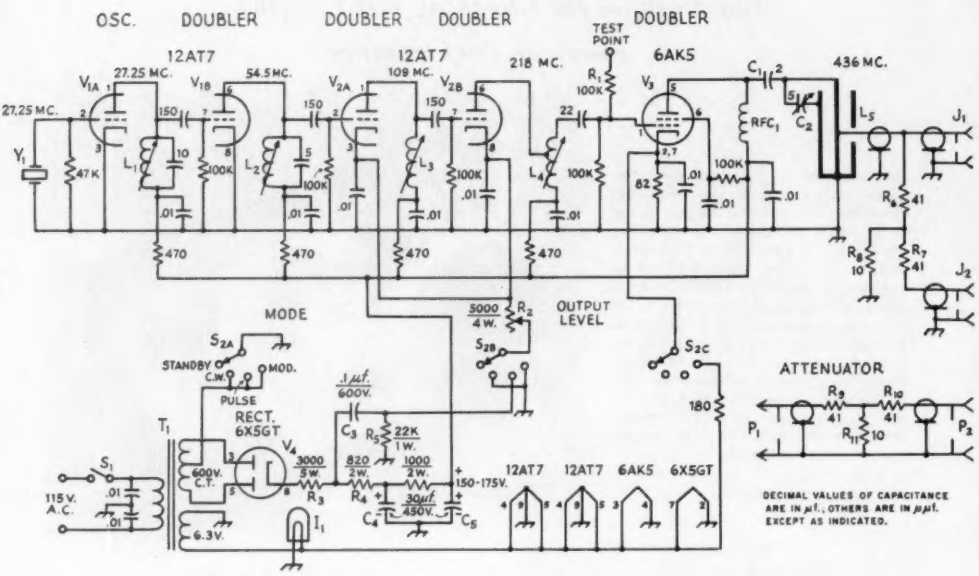


Fig. 2—Circuit diagram of the signal generator. Unless indicated otherwise, resistors are ½ watt. 0.01-μf. capacitors are disk ceramic; others are tubular ceramic, except as specified below.

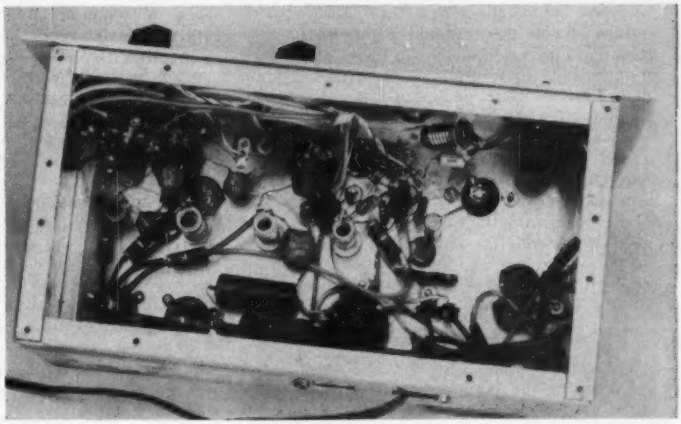
C_1—2-μμf. tubular ceramic.
C_2—1-5-μμf. plastic trimmer (similar to Erie 532-A).
C_3—0.1-μf. paper, 600 volts.
C_4, C_5—30-μf. electrolytic, 450 volts.
I_1—6.3-volt pilot bulb.
J_1, J_2—Coaxial chassis receptacle (Amphenol 31-102).
L_1—15 turns No. 28 enamel close-wound on ¼-inch iron slug-tuned form (National XR-83). (North Hills 1300-C or Miller 20A106RB1 coils also usable.)
L_2—6 turns No. 22 enamel close-wound on ⅜-inch iron slug-tuned form (National XR-93). (North Hills 1300-B or Miller 20A107RB1 coils also usable.)
L_3—6 turns No. 16 tinned, ½-inch long, on ⅜-inch brass slug-tuned form (National XR-92).
L_4—2 turns No. 16 tinned, ½-inch long, on ⅜-inch brass slug-tuned form (National XR-92), center tapped.
L_5—Coaxial tank, see text.
P_1—Coaxial plug (Amphenol 31-212).
P_2—Coaxial receptacle (Amphenol 31-206).
R_1—0.1-megohm, ½ watt.
R_2—5000-ohm 4-watt wire-wound potentiometer.
R_3—3000 ohms, 5 watts.
R_4—820 ohms, 2 watts.
R_5—20,000 ohms, 1 watt.
R_6, R_7, R_9, R_{10}—41 ohms, ½ watt.
R_8, R_{11}—10 ohms, ½ watt.
RFC_1—25 turns No. 26 enamel spaced wire diameter on ¼-inch-diameter form.
S_1—S.p.s.t. toggle switch.
S_2—1-section, 3-pole, 4-position rotary switch (Centralab PA-5 switch section and PA-300 index).
T_1—Power transformer, approximately 600 volts c.t. at 50 ma., 6.3 volts at 1.375 amp. (Triad R-5A suitable).
Y_1—27.25-Mc. radio control crystal.

ments tried and is simple to make.

The power transformer used has somewhat higher voltage than actually needed. This surplus is put to good use, however, when pulsed output is used. Figure 3A shows the waveform at the junction of R_3 and R_4, this being simply a train of 120-cycle pulses from the rectifier. The differentiating circuit composed of R_5 and C_3 modifies this waveform to that shown in Fig. 3B. This voltage is applied to the cathodes of both sections of V_2 when the mode switch S_2 is in the "pulse" position. These two doubler stages are normally near cut-off, but the sharp, negative-going pulses drive them into conduction for a few milliseconds once every 1/120th second.

While the unit was primarily intended as a pulse generator, S_2 does provide for other modes of operation. In the "c.w." position, it grounds the cathodes of doublers V_{2A} and V_{2B}, these stages operate normally, and continuous output is obtained. These cathodes are also grounded when S_2 is switched to "mod.," but here sine-wave modulation is accomplished by applying about 2 volts a.c. to the cathode of the 6AK5 final stage. The 60-cycle modulation envelope may not be a perfect sine wave for all possible adjustments of the tuned circuit, but it is perfectly satisfactory for test purposes. For all three output conditions, R_2 controls the output signal level by varying the bias on V_{2A} and V_{2B}. In "standby" position, S_2 removes high voltage from the whole r.f. section by ungrounding the high-voltage center tap of T_1.

A built-in 50-ohm-to-50-ohm pad between J_1 and J_2 reduces the output at the latter terminal



Bottom view. From left to right along the top (front) are mode switch S_2, excitation control R_2, the pilot light, and power switch S_1. The open end of the coaxial tank can be seen between the pilot light and S_1. The tube sockets are on a line to the left of the tank, and slug-tuned coils L_1, L_2, L_3 and L_4 and the tubular trimmer C_2 form another line immediately below them. Power-supply components are arranged along the rear apron.

by 20 db. and also isolates a load connected there from the generator. A separate 20-db. attenuator can be plugged into J_2 to cut the output still further, or into J_1 to provide two identical but isolated outputs.

Construction and Adjustment

The generator is built on a 5 × 9½ × 3-inch aluminum chassis. In the original version, the chassis top was sawed out, and the components were assembled on a 5 × 9½-inch plate which then replaced the original top. Wiring up the parts was easier on an open plate than down in the depths of a chassis. As an alternative arrangement, one might build the generator on a plate, get it working, and then fasten the plate to the open side of an inverted chassis of the same size. The panel is simply a 7 × 10½-inch piece of aluminum.

R.f. components are lined up along the front of the unit as shown in the photos while the power supply is located to the rear. S_2, R_2, the pilot lamp and S_1 are mounted on the front apron. Aside from keeping all leads as short as possible in the r.f. section, about the only construction feature requiring special note is the coaxial tank circuit. The outer conductor is a 2½-inch length of 1-inch diameter brass pipe with a snug-fitting brass washer soldered into the top end. A larger washer soldered to the outside of the pipe at the opposite end serves to fasten the tank to the chassis. The inner conductor is a 2½-inch length of ¼-inch brass rod threaded at one end for a distance of about ⅜ inch. The threaded end of the rod goes through the washer at the top of the tank and is secured by two nuts. The rod can be drilled and tapped at the opposite end to take a 6–32 screw, and a lug placed under this screw will serve for connection to C_1 and C_2.

R.f. output is taken from a tap on the inner conductor of the coax tank about ¾ inch from the shorted end. Several methods of making the tap are satisfactory. A simple one is to solder an insulated wire to the ¼-inch brass rod and bring it out through a hole in the 1-inch brass pipe. Another way is to drill and tap the rod for a 6–32 screw which can project out through a clearance hole in the pipe. The special fitting shown in the photographs was made up so that the output tap could be shifted. This is unnecessary since a fixed tap point has proved perfectly satisfactory.

From the tap, a short length of coax goes to J_1 on the panel. Resistors R_6, R_7 and R_8, which make up the built-in attenuator, run along a strip of flashing copper or brass shim stock bent into an L shape. This is held to the panel by the nuts used to mount J_1 and J_2. The coax shield braid and the grounded end of R_8 are soldered to this strip. The external attenuator, shown partially disassembled, is made with fittings P_1 and P_2 and a 1⅛-inch length of 7/16-inch diameter brass pipe. This pipe is threaded at both ends with 32 threads per inch so that it will screw into the two fittings. R_9 is soldered to the removable center contact of P_1. R_{10} runs from the other end of R_9 to the center contact of P_2. One end of R_{11} goes to the junction of R_9 and R_{10}, and the other end is soldered through a hole in the outer portion of P_2. A couple of turns of tape around the resistors will insure against shorts when the assembly is screwed together.

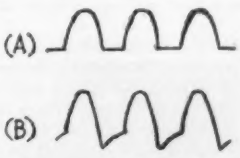


Fig. 3—Waveforms present (A) at the junction of R_3 and R_4, and (B) after passing through differentiator C_3-R_5.

Tuning, up to and including the 218-Mc. circuit, can be checked with a grid-dip meter used as an absorption wavemeter. If you are as lucky as we were, everything will tune up using only a v.t.v.m. plugged into the test jack to indicate alignment of the first four tuned circuits. With the function switch in the c.w. position and the out-

put level control near maximum, the negative voltage at this point should be about 2.5 to 3 volts. Even if you have to do a little coil pruning or squeezing, this is quite simple with a grid-dip meter. The S meter on a 436-Mc. receiver can then be used to indicate maximum output of the 6AK5 stage when tuning the coaxial tank.

Each of the 12AU7 stages draws about 3-ma. plate current with 175 volts applied to the 470-ohm decoupling resistors. Combined plate and screen current for the 6AK5 will be about 4 ma. There is probably no real need to measure these currents, however, if the specified voltage is obtained at the test point and there is output at 436 Mc.

Application

The generator has proven to be quite useful in comparing the gains and signal-to-noise ratios of various r.f. preamplifiers. Two methods of making comparative receiver checks have been used. One involves the use of 40 db. of attenuation (both the built-in and external pads in series) between signal generator and receiver to tie down the source impedance seen by the load. The second method makes use of a test antenna erected some distance from and in front of the regular receiving antenna. The signal generator feeds the test antenna through J_1 without the attenuator in the line. Different receivers can then be compared by connecting them to the regular receiving antenna. It might be emphasized that the pulse technique aids greatly in getting parametric amplifiers going for the first time. The generator output can be run fairly high, and some signal will feed through the paramp even when it is not working properly. The effect of each adjustment can be seen clearly.

The most satisfactory way of tying the oscilloscope to the receiver is to connect it directly across the detector load resistor. The average audio stages are not good enough to pass narrow pulses; hence the need to connect ahead of them. In one receiver, the high end of the detector load resistor was connected through a 47,000-ohm resistor to a coaxial connector on the rear apron. Shielded wire must be used to prevent feedback at the i.f. and preserve the receiver's stability.

Other instruments have been used for actual quantitative measurements, although it should be possible to calibrate the output control, R_2. Another possibility would be the inclusion of an r.f. v.t.v.m. calibrated in microvolts or millivolts at the output circuit. A further refinement would be voltage stabilization of the crystal oscillator plate voltage. A VR105 and suitable dropping resistor should prove satisfactory.

QST

Strays

STOLEN

W5TCF reports that on or about Dec. 10 his vacation cottage near Pickwick Dam, Tenn., was broken into, and the following equipment stolen: (a) a Hammarlund HQ-110-C receiver, serial number 393, and (b) a Gonset 6-meter Communicator model 3049, serial number 5536.

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K2EVE reports that on January 4 his auto was broken into and the following equipment stolen: (a) a Gonset 6-meter Communicator model 3136, serial number 2759, and (b) a Shure 102C mike.

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KØAXU (the Northwest St. Louis ARC) reports that the following equipment was stolen from its club rooms sometime between Dec. 13 and Dec. 30: (a) a Johnson Viking Ranger transmitter serial number 60501, (b) a BC-614D speech amplifier serial number 1732, (c) six tuning units for a BC-610, (d) a BC-611E walkie-talkie, serial number 4764-CGG, with "Civil Defense" stenciled on the side, (e) two BC-611C walkie-talkies, serial numbers 11267 and 13627, with "Civil Defense" stenciled on the side, and (f) an Onan 3½ kva gasoline-driven 110-v. generator, serial number 43115. Any information relating to this equipment should be forwarded to Jim Goddard, WØPUV, 1122 Darr Drive, St. Louis 37, Mo.

According to an article by KH6IJ in the Honolulu *Star-Bulletin*, pioneer amateur W6EA, who made a lot of history in the earliest days of ham radio, is regularly on 7010-kc. c.w. His receiver is a regenerative job using 201s, which he built in 1924. His transmitter is somewhat newer, dating from 1937 and being still in its original open breadboard form.



No ignition noise here. K7NOJ is on her way to the ARRL Southwestern Division Convention in Phoenix. The convention isn't taking place until May 26, but this is no Corvette! She is keeping in touch with the outside world with a Communicator, while waiting for the May issue of QST to bring more convention details.

No Shielding, No Filters — No BCI, No TVI.
Up to 120 Watts Input, With Two Tubes

Wide-Band F.M. Gear for 220 Mc.

BY CALVIN F. HADLOCK,* W1CTW—W1IQD

MUCH progress has been made by amateurs on the v.h.f. and u.h.f. bands. Greater distances are being covered and new modes of propagation and operation are being exploited; all this bringing well-deserved credit to the amateur fraternity. The writer certainly does not wish to detract from this credit, but there are other aspects of the picture that deserve consideration.

The quest for improved performance has resulted in ever higher stability requirements and consequent complexity. Narrow bandwidth, for improved signal-to-noise ratio on very weak signals, costs money, and the higher the frequency the more it costs. A crystal-controlled transmitter delivering only a few watts at 1296 Mc. may entail an expenditure of $100 or more for tubes alone.

Of course, the builder who is a professional engineer will not have to pay that price, but Joe the druggist or George the garage mechanic will. Their attitude is likely to be, "Why should I lay out a hundred bucks for tubes to do a job I can do for little or nothing on a lower frequency? And anyway, I probably couldn't build the thing, let alone make it work!" We want Joe and George in the game, but we have to admit that they have a strong argument.

Because of the universal use of narrow-band techniques, the operating trend on the v.h.f. and u.h.f. bands is to spot-frequency work, in one small segment of the band concerned. The 220-Mc. band is 5 megacycles wide. To make the best possible use of all of it, the space above the first 500 kc. or so might well be used for exploitation of various wide-band techniques, such as the f.m. system about to be described. This approach is already employed to some extent in the 420-Mc. band, where wide-band modes are used in the upper and lower segments of the band, leaving 432 to 436 Mc. for c.w. and narrow-band voice work. Similarly, in the 1215-Mc. band we find APX-6s and other simple gear spread over most of the band, except for 1296 to 1300 Mc., which is reserved for moon-bounce and other highly developed narrow-band operations.

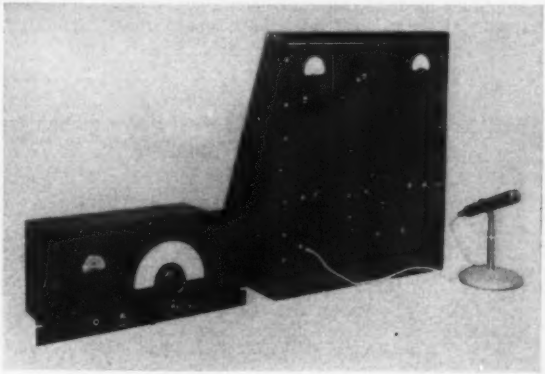
Often the DX-happy ham will ignore local stations. Nothing makes a newcomer more disgusted than to fire up, full of enthusiasm, only to be snubbed by operators who will not talk to anyone unless he is "DX." This emphasis on DX and fancy gear may have discouraged many a budding v.h.f. enthusiast. I feel that if these fellows are given information that will enable them to build reasonably effective equipment at moderate cost, they would come on 220 Mc. and higher bands in relatively large numbers. I have heard many new hams say, in effect, "Give me something I can build myself and make it work, without getting lost in the parasitics, or going bankrupt!" This article is an attempt to provide such a project.

The Case for Wide-Band F.M.

Our effort will be to see how *simple* we can make the equipment and still get effective performance. Instead of increasing the stability requirements, we will relax them, by going intentionally wide-band. The gear to be described is not "the last word." It is merely an attempt to demonstrate a concept; others are encouraged to try and improve it.

Our simple approach, via wide-band f.m., yields another bonus: the complete elimination of BCI and TVI of any kind you can be blamed for. In my experience when a.m. is used, 220 is the worst band of all for audio TVI and BCI. At this frequency a.m. signals just love to get into the grid

* 41 Bellington St., Arlington, Mass.



Everything used in the 220-Mc. wide-band f.m. station, except the antenna, is in this photograph of the setup at W1CTW. Receiver, left, is a revamped f.m. broadcast job. The transmitter rack has the 50-watt r.f. section at the top, with power supply and speech equipment occupying the two lower panels.



Rear view of the 220-Mc. transmitter rack. The amplifier stage is visible in the top deck. Oscillator circuitry is under the chassis out of sight.

circuit of an audio amplifier, and the more you try to get rid of the interference by turning down the volume control, the worse it gets. A.c-d.c. sets are the worst offenders, but all kinds of audio amplifiers are prone to "audio rectification" troubles. BCI is eliminated by the use of f.m. in our simple transmitter. TVI is virtually eliminated by using only frequencies above the v.h.f. TV channels. No harmonics are generated that can land in any TV channel below 660 Mc., and should a harmonic fall in a local u.h.f. channel it can be moved out by shifting the transmitter frequency.

F.M. the Easy Way

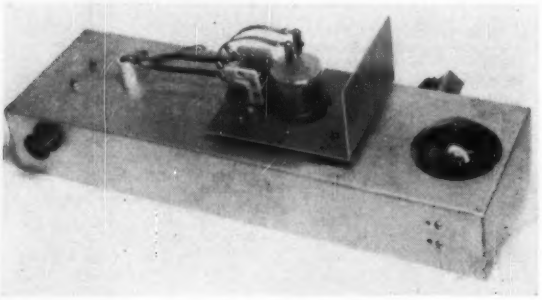
Though the oscillator in our transmitter is amplitude modulated, the rig should not be confused with the modulated-oscillator type of transmitter of odious reputation. The signal radiated is true wide-band f.m. Low-level amplitude modulation of the oscillator is employed as a convenient and inexpensive way to produce the desired f.m. deviation. The *incidental* a.m. is wiped off by the final amplifier grid acting as a limiter. Frequency swing could have been produced with a reactance modulator, but the method shown offers greater simplicity, and no circuit elements are hung across the oscillator r.f. circuit, to cause changes in oscillator frequency because of heating.

Variation of the oscillator plate voltage at an audio rate (amplitude modulation) produces very satisfactory frequency modulation if not carried too far. A curve of oscillator frequency plotted against plate voltage will be a straight line for voltages up to 40 per cent or so above and below the nominal voltage. This means that the f.m. so produced will be distortion-free. In the transmitter described, a modulation level of only 8 to 10 per cent is needed, so good-quality f.m. is easily obtained.

In using f.m. effectively, the deviation of the transmitter and the bandwidth of the receiver must match. There are thousands of f.m. broadcast receivers in use today, some selling at very low prices. With a bandwidth of about 150 kc., for use with f.m. broadcast signals, they make fine i.f. systems for v.h.f. converters, in the same way that most v.h.f. stations now employ communications receivers with converters for a.m. and c.w. reception. If we design our f.m. transmitter for 75-kc. deviation we are all set.

The complete f.m. station layout at W1CTW is shown in the first photograph. On the right is the transmitter assembly, all prettied up with panels and mounted in a table rack. At the top is the 220-Mc. r.f. unit. The center unit is a dual power supply, only part of which is used to give 500 volts at 100 ma. for the final stage, and 255 volts, regulated, for the oscillator, amplifier screen, and modulator. The bottom section is the speech amplifier, clipper and modulator.

The receiver at the left is an old National NC-108 f.m. broadcast receiver, with its front end modified for 220 Mc. The i.f. and audio sections are unchanged. This is not the easiest way to provide for 220-Mc. wide-band f.m., but it makes a convenient package and its sensitivity is excellent. It is also free of spurious signals, as it is a



The 220-Mc. r.f. assembly without its panel. The oscillator tube is at the right.

single-conversion superheterodyne with its oscillator running on the high side of the signal frequency, to avoid picking up high-band TV signals as images. This and other receiving methods will be treated in more detail later.

In the rear view of the transmitter the final-amplifier tube is in the center of the top deck. The final plate current meter is on the right, and the meter at the left is a 3-volt a.c. job (25¢ at a radio club auction) to indicate oscillator heater voltage. Just below it can be seen the top of the oscillator tube, and on the rear wall the modulation choke. The modulator, with its own power supply, was built for another purpose about 12 years ago, and was used "as is" for convenience. It and the main supply, above, could easily have been built into one unit otherwise. Only about 20 milliwatts of audio power is needed, so the modulator could be transistorized, but we leave such obvious details to the builder to work out for himself.

Transmitter Design

Photos of the r.f. unit, and its circuit diagram, Fig. 1, show how simple the transmitter really is. Old-timers may be horrified to see the old familiar WE 316A "doorknob" used as the oscillator, but this tube has been greatly underestimated. I could not think of a better choice for the job, especially since I was able to obtain 27 of them by sending a five-dollar bill (minimum order) to a surplus house in Philadelphia. Though its filament is rather fragile, only one tube of the 27 arrived with an open filament. Net cost per tube was therefore 19 cents; real cheap for a tube with a 30-watt plate dissipation and full input up to 500 Mc.

Its chief drawback is its odd-ball filament rating: 2.0 volts at 3.65 amperes. This was taken care of easily by using an 866 filament transformer, with a variable resistor in the primary to drop the output voltage to 2.0. It is also necessary to center-tap the filament to minimize 60-cycle frequency modulation of the oscillator. This hum sounds terrible on a narrow-bandwidth receiver, but it is inaudible when using the 150-kc. bandwidth for which the transmitter was designed. Sticklers can try a "humdinger" or a d.c. supply.

Philosophy behind use of the 316A was that it is better to use a large tube running lightly than a smaller tube heavily loaded. If the tube filament is turned on 10 or 15 minutes before going on the air, its heating effect is nearly stabilized before the transmitter is used. Plate input runs around 4 watts, about half the filament power

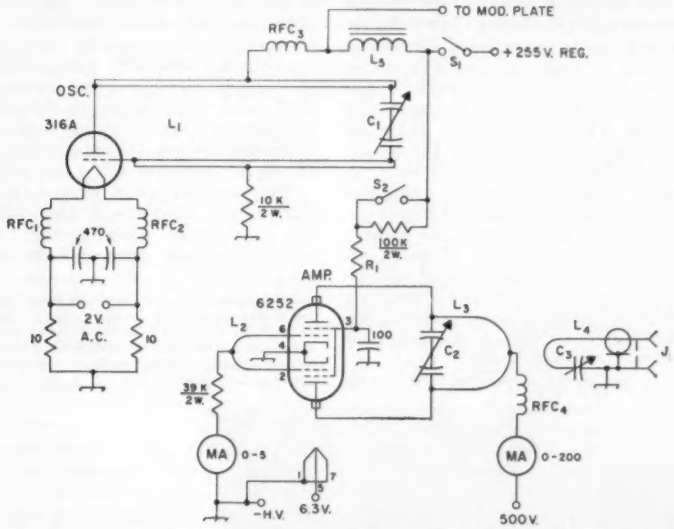


Fig. 1—Schematic diagram and parts information for the wide-band f.m. transmitter. Capacitor values are in μμf., resistor values in ohms, ½ watt if not otherwise specified.

C_1, C_2—Midget double-spaced split-stator, about 6 μμf. per section. Do not ground rotor. See text.

C_3—25-μμf. variable, single-spaced.

J_1—Coaxial fitting, SO-239.

L_1—Parallel lines of ¼-inch copper tubing, approx. 1 inch c. to c., 14 inches long.

L_2—2½-inch length No. 10 wire, bent into U shape. See bottom view and text. Adjust size to resonate at 260 Mc.

L_3—6-inch length ¼-inch copper tubing, bent into U shape Flexible leads of braid or strip each 3 inches long. See photo.

L_4—U-shaped loop made from a 2½-inch length No. 16 wire, coupled to L_3.

L_5—10-hy. 50-ma. filter choke.

R_1—10,000 ohms, 2 watts. See text.

RFC_1, RFC_2—10 turns No. 20 wire, ¼-inch diam., self-supporting. See text.

RFC_3, RFC_4—15 turns No. 20 enam., 1¼ inch long, on ¼-inch diam. rod or resistor.

S_1, S_2—S.p.s.t. toggle switch.

of a tube having a 30-watt plate dissipation rating. The slight drift in each transmission can be reduced by mounting a fan to blow air on the tube. This should come on only when plate power is applied, and go off each time the plate power is removed. Judicious placement of the fan may completely compensate for drift due to plate heating. I have not used a fan thus far, as drift without it is not bothersome with a receiver of appropriate bandwidth.

The oscillator is extremely simple. It has parallel half-wave rods in the plate and grid circuits, tuned at the far end from the tube by a small split-stator capacitor. Bias and plate-voltage connections are made to the rods near the middle of the line. The rods are ¼-inch copper tubing. Optimum spacing for highest *Q* would be about the rod diameter. Those who remember line oscillators of early v.h.f. work may think that better circuit *Q* could be obtained with larger rods. Not so! This idea was based on the assumption that radiation from the rods was negligible. Later work taking radiation loss into consideration showed that, for a given frequency and maintaining a spacing of one rod diameter, there was a definite diameter which produced maximum *Q*. At 220 Mc. this is about 3/16 inch. The oscillator described uses ¼-inch copper tubing at somewhat more than optimum spacing, in order to keep the tank circuit short enough to fit inside a 17-inch chassis.

The filament chokes visible below the tube in the bottom view are bare wire wound ¼ inch in diameter. The turn spacing is adjusted to give maximum output at the middle of the band, with minimum input. This is not critical. At the far end of the chokes from the tubes are the two 10-ohm resistors for center-tapping the filament circuit. These are bypassed with two small disk capacitors. Short leads are important here.

The grid resistor and plate choke are soldered to the parallel rods at the point of lowest r.f. voltage. Connect them at the middle of the rods and then run a pencil or insulated screwdriver along the rods to find the points of least reaction on the plate current or output. Reconnect the resistor and choke at these points.

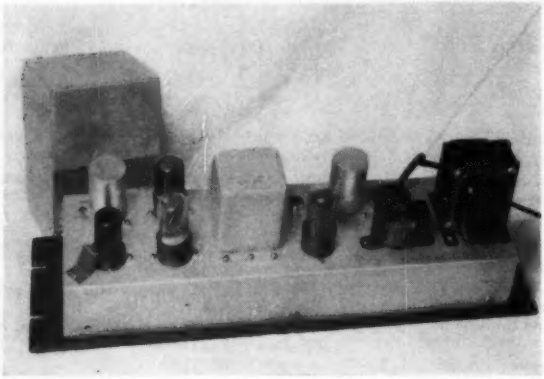
The rods are supported at one end by soldering to the tuning capacitor lugs and at the other end by the tube. You might say that the rods help support the tube, for the action is mutual. Chief support for the tube is furnished by a crystal socket mounted on a cross-strip visible in the bottom view. The filament pins of the 316A fit tightly into the type of socket used for FT-243 crystals (pin diameter 0.095 inch, spaced 0.486 inch; National Type CS-6). Tight connection to the rods is made by drilling them near the tube end about the pin size, and then slotting the rod back through the hole to a depth of about one inch. Squeeze the end slightly until the pin slides in with a tight fit.

The split-stator tuning capacitors were picked up some years ago on the surplus market. They have two stator and two rotor plates per section, double-spaced, and are just right for the job. I have not found a current listing for this type of capacitor, though suitable substitutes can be made up from several available types.[1] The rotor is *not* grounded to the chassis.

The one item for the transmitter that can be expensive is the final amplifier tube. An 832A can be used with good efficiency, and at low cost if the tube is picked up on the surplus market. Input must be held to 25 watts or less, however. An 829B will work, but at rather low efficiency on 220 Mc., and its higher capacitance and lead inductance may require use of half-wave-line plate and grid circuits. The 316A oscillator will drive an Amperex 5894/9903 easily, with up to 120 watts input. The tube shown here is an Amperex 6252, used chiefly because it was on hand. It is an excellent tube, though the input must be held to around 50 watts. It should perform beautifully on 420 Mc., when we get to that project.

The amplifier runs without neutralization. Purists may neutralize, if they wish, but it is not necessary for stable operation. An amplifier plate circuit must resonate higher in frequency

[1] This capacitor is now available from Millen as 21906R, but it may not be a current stock item. It may still be found occasionally under various names on surplus, or a suitable substitute can be made by modifying any of several designs having ceramic supports at both ends. Millen 21935 and 21050 are examples. — *Ed.*



The speech amplifier, clipper and modulator for the f.m. station, with its own built-in power supply. Note grounding clip on the first speech amplifier tube, left front. An r.f. shield, shown here removed, covers all three audio tubes.

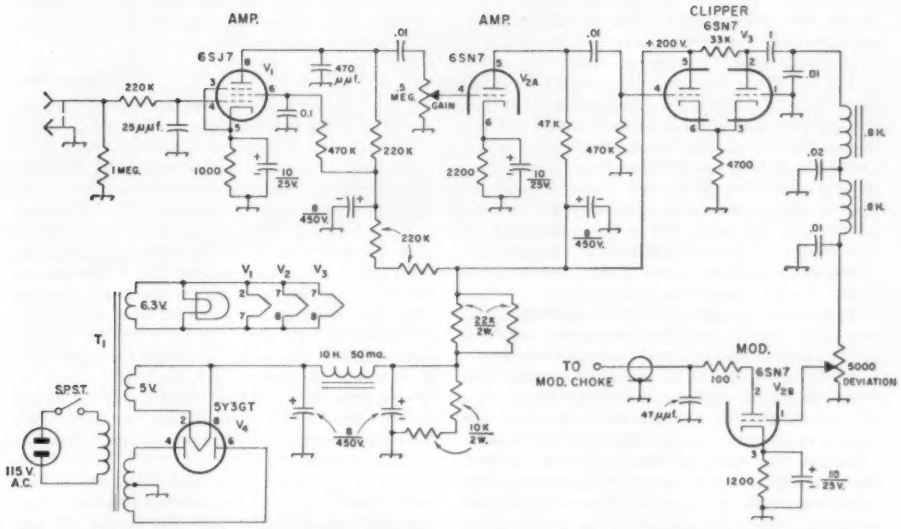


Fig. 2—Circuit of the speech amplifier, clipper and modulator used with the 220-Mc. f.m. transmitter. Capacitor values are in μf., resistors ½ watt, unless specified. Those with polarity marked are electrolytic. Value of two resistors shown in parallel should be adjusted to give 200 volts at the first clipper plate.

T_1—Plate-filament transformer: 5 v., 2.5 amp.; 6.3 v., 1.8 amp. or more; 500 to 600 v. c.t., 50 ma.

than the grid tank for the stage to oscillate. In this amplifier the grid circuit is resonated with the input capacitance of the tube to about 260 Mc., and then coupled inductively to the oscillator plate circuit sufficiently to give the required grid drive. The screen is bypassed with a mica capacitor, with minimum lead length.

The platform around the tube completes the internal shielding of the 6252 tube, and isolates the plate from the oscillator tube. It also provides a mounting for the amplifier plate tank, and is grounded to the main chassis through metal spacers. The plate connectors for the amplifier are made by drilling and tapping ¼-inch brass rod. Plate leads are flattened shield braid, though thin copper or brass strip might be better. The plate tank is ¼-inch copper tubing.

Operation

No antenna coupling is shown in one of the photographs. In preliminary use the feeder to a Twin-Lead dipole was clipped onto the plate tank through blocking capacitors. For coax-fed antennas a coupling loop and series capacitor should be used, as shown in the schematic diagram. The coaxial fitting is visible in the rear view of the rack-mounted transmitter, but the series capacitor does not show. It is adjusted through a hole in the front panel, near the plate capacitor knob at the center of the panel. One may use an untuned coupling loop and a balanced feeder to a balun, to convert to coaxial line in order to make use of a coaxial relay. Another balun can then convert back to balanced line for the main run, if desired.

When tuning up, determine the approximate band-edge settings for the oscillator tuning capacitor, and then stay well inside them. The position of the grid loop on the amplifier should be adjusted with respect to the oscillator plate line so that a grid current of around 2 ma. will be obtained near the middle of the band, and no less than 1.5 ma. at any frequency to be used. Less drive will result in lowered amplifier efficiency, and less effective a.m. limiting action. It may be found that minimum plate current and maximum output do not quite coincide. A field-strength meter, or a power-indicating s.w.r. bridge connected in the transmission line, will give a good indication of plate tuning for maximum output. The value of the screen resistor, R_1, should be set to give maximum output at full-load plate current. This will be about 10 per cent less than the maximum off-resonance plate current.

The toggle switch visible on the back wall of the transmitter chassis is used to connect a 100,000-ohm resistor in series with the 6252 screen, to reduce plate current to a safe value for tuning up. When the plate circuit has been resonated, closing the switch restores normal screen voltage, allowing full input. In use the amplifier plate voltage is left applied continuously, and the screen and oscillator voltages are applied for transmission.

Modulation

Since we modulate only 8 to 10 per cent, Heising (choke) modulation is entirely satisfactory. This dispenses with a modulation transformer, and an inexpensive 50-ma. filter choke is adequate. Modulating 4 watts input at 10 per cent requires no more than about 20 milliwatts of

audio power. This can be supplied by any small triode, with power to spare. The modulator shown uses one half of a 6SN7, the equivalent of a 6J5. It was built about 12 years ago, but is well suited to the job. Note the grounding clip on the 6SJ7 metal tube at the left. This was needed to ground the shell adequately, and keep r.f. out of the first stage. The r.f. shield is also necessary, as r.f. and hum pickup must be kept down for good quality with f.m. The other tubes are 6SN7s. Half of one is the second stage of speech amplification, and the other half is the modulator. In between these is the double-ended clipper, adjusted to the clip both sides of the audio at equal levels. It also gives extra speech gain.

There are two gain controls, one before and one after the clipper. The first affects only the over-all gain of the circuit; the second is the deviation control. It is set to provide no more than 75-kc. deviation, by listening to the signal on a 150-kc. bandwidth receiver and adjusting the control so that the signal is clear. It is followed by a 2-stage 3-kc. low-pass filter, which is excellent for n.f.m., but is more elaborate than needed for wide-band work. A simple *RC* filter would be adequate for present purposes.

Do not leave out the clipper. It makes all the difference in the world in f.m. quality and effectiveness. Excessive deviation causes severe distortion very quickly in f.m. systems. Performance of the clipper can be checked with an oscilloscope at the grid of the modulator.

The second half of the first 6SN7 mentioned is the modulator. The *RC* filter at its plate (to keep r.f. from getting into the modulator circuitry) is connected to the modulation choke through coax. The power supply is conventional, but the clipper balance can be upset by changing the B-plus supply to the clipper tube. The dropping resistors should be adjusted to provide about 200 volts on the first clipper plate. The microphone shown is a high-impedance dynamic, though crystal microphones of similar output level work equally well.

Reception

Probably the simplest solution to the f.m. receiver problem is the purchase of an AN/TRC-8 receiver in the surplus market. This is a single-conversion wide-band f.m. job covering 230 to 238 Mc. Resetting the three front-end trimmers will move its range down to include the 220-Mc. band.

The i.f. is 28.5 Mc. As measured by the writer it is 900 kc. wide at 6 db. down, spreading to 6650 kc. at 60 db. Removing the 4700-ohm resistors in parallel with all i.f. tuned circuits except the discriminator resulted in a bandwidth of 100 kc. at 6 db. and 1720 kc. at 60 db. The i.f. also oscillated like mad! To correct this, the negative bias on all grids except the first r.f. was removed from the fixed bias resistor and connected to the arm of the squelch bias potentiometer. The gain was then backed down to just below the oscillation point.

The r.f. amplifier stage should be left at full gain (fixed bias) for best signal-to-noise ratio. Loading resistors were put back in the i.f., but with a value of 33,000 ohms. This gives about the right bandwidth, and the receiver is stable. Cross-band contacts have been made with W1QA and W1HOH, who were using AN/TRC-8s unrevised, except for tuning range. The chief weakness of this receiver is that considerable second-harmonic distortion is evident on weak signals. It is built like the proverbial battleship, and for wide-band f.m. it is a good buy.

Excellent 220-Mc. wide-band f.m. reception is obtained with a 220-Mc. converter ahead of an f.m. broadcast receiver. The writer built a receiver covering the prewar f.m. band at 42 to 50 Mc. many years ago. The circuits in this were padded until it tuned 30 to 35 Mc., and it was

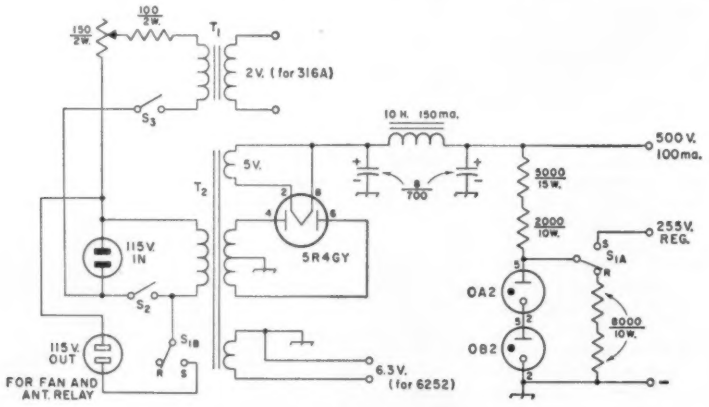
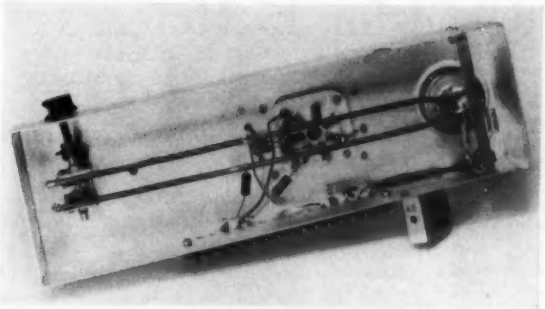


Fig. 3—Power supply for the f.m. transmitter.

S_1—Send-receive switch, d.p.d.t. toggle.
S_2, S_3—S.p.s.t. toggle.
T_1—2.5 volts, 5 amp.
T_2—Plate and filament transformer; 5 v., 3 amp.; 6.3 v., 2 amp. or more; 900 to 1000 v. c.t., 150 ma.



Bottom view of the 220-Mc. r.f. unit, showing the oscillator plate line. The amplifier grid circuit is a small U-shaped loop, inductively coupled to the oscillator plate circuit, near the point of lowest r.f. voltage.

then used with a National NC-303 220-Mc. converter. There are also several communications receivers that have wide-band f.m. coverage from about 27 to 110 Mc., and any of these will serve nicely with various 220-Mc. crystal-controlled converters. An advantage in this approach is that the converter can be switched to a regular communications receiver for a.m., c.w. or n.f.m. reception on 220 Mc.

A tunable i.f. system covering 30 to 35 Mc., or whatever frequency range your converter requires, is fairly simple to build and adjust. The f.m. detection system can even be a super-regenerative detector, for the ultimate in simplicity, though this method sacrifices the fine audio quality and noise-silencing characteristics of the true f.m. system.

The receiver shown in the complete station photograph was made from a National NC-108 f.m. broadcast receiver. The front end and dial assembly were removed and a 220-Mc. front end substituted. This uses a dual triode r.f. stage (cascode), a 6AK5 mixer and a 6AF4 oscillator, tuning 10.7 Mc. above the signal frequency. Running the oscillator on the high side is desirable with a 10.7-Mc. i.f., particularly if you have high-band TV stations within receiving range. They can cause a lot of image trouble with the oscillator on the low side.

Still another approach is to build or remodel a 220-Mc. converter so that it will work into f.m. tuners covering the present f.m. band at 88 to 108 Mc. This was done with a National 220-Mc. converter of the crystal-controlled type. The crystal oscillator and multiplier circuits were removed and a tunable oscillator covering 133 to 138 Mc. substituted. The 6U8 mixer-multiplier was removed and a 6AK5 mixer substituted. The tunable oscillator tube is a 9002 or 6AF4A. The mixer can be coupled into the antenna input of the f.m. tuner in a manner similar to that used with converters working into communications receivers. The i.f. is on a fixed frequency, so local f.m. stations are not a problem. Select a frequency that is clear of interference locally, and you'll be all set. We used 87 Mc., just outside the f.m. band, to be safe.

Some Final Thoughts

Don't expect extensive coverage with a dipole. An antenna two feet long does not intercept much signal energy. This takes something big, but a high-gain array can be built for 220 Mc. without its being excessively cumbersome. The Cushcraft 32-element array now in use at W1CTW has a gain of around 17 db., yet it is only 8 by 6 feet in size, and can be erected easily by one man. The Yagi-collinear controversy is resolved easily with wide-band f.m. Our philosophy, stated earlier, was to promote full use of the band. This is a job for the collinear type of array. Sharply tuned Yagi systems are out.

The equipment described is a fine project for a club group, and the objective is to get more stations on the band. Good coverage can be obtained with simple equipment, but if you are the DX type you will do better with narrow-band techniques — at higher cost and much greater complexity.

The writer would rather see a large group of hams working regularly over a 50-mile radius or so than a pair of hams working occasionally over 300 miles or more. In this way you may find that the fellow whom you have cussed for clobbering your contacts on 14 Mc. is really quite a nice guy when you talk with him on 220 — and you won't get into trouble with your neighbors while doing it.

No claim for originality is made for any of the ideas used in this equipment. Most of it is real old stuff, but lashed up together in such a way as to get the most possible for the least expense and effort. It is presented to offer a way for many hams, especially new ones, to get started, and find out how interesting and enjoyable our higher bands can be. The most encouraging comment I have heard, in showing this gear at hamfests, club meetings and conventions, is "There is something even I could build!" QST

Strays

During a recent meeting of the East River Radio Club (Bluefield, W. Va.) one of the newer club members, also a newcomer to ham radio, was looking over the items on the auction table. He picked up a huge high-voltage neutralizing capacitor, and after inspecting it said that he once had one of these but thought that it was a hot-patch machine. W8SSA says this brought the house down!

All-Metal Quad for 15 Meters

Single-Band Array of Simple Construction

BY EDWIN FEHRENBACH,* KZ5EG

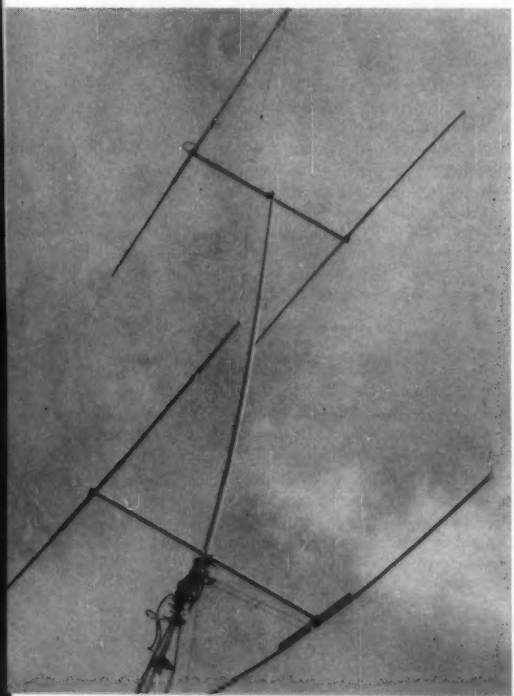
This quad design will be attractive to many because it does not require a welded "spider," bamboo poles, or other fittings that are sometimes hard to get. Standard TV hardware has been put to good use.

THE 15-meter quad antenna shown in the photographs came into being chiefly because of the tropical climate that the Canal Zone enjoys (?), which is sometimes not too kind to some conventional beam-antenna designs. It has proved to be one of the simplest to make and easiest to put up of the several types that the author has constructed for the 21-Mc. band.

Elements

A study of the photographs will leave little to the imagination. The horizontal top and bottom sides of the two quad loops are of aluminum tubing, while the vertical sides are of No. 12 or 14 wire. The top side of the driven element and the bottom side of the reflector are lengths of ⅝-inch aluminum tubing split at the center, respectively, for the feed line and tubing stub. The two halves in each case are mounted on 2-inch standoff insulators supported by 30-inch lengths of 1 × 1 × ⅛-inch aluminum angle. The other two horizontal members are not split, and consist of a 30-inch center section of 1-inch tubing with extensions of ⅝-inch tubing, shimmed as necessary to fit snugly into the center section.

* Box 537, Curundu, Canal Zone.



An all-metal quad. The horizontal top and bottom sides are of aluminum tubing. Copper wire is used for the vertical sides.

Both ends of each horizontal member are flattened and drilled to take a No. 8 machine screw for attaching the vertical wires forming the sides of the quad loops.

Mast and Booms

The two booms are lengths of 1¼-inch tubing. An element spacing of 5½ feet is approximately 0.12 wavelength. TV U bolts and saddles are used to fasten the elements to the ends of the booms. The booms are fastened to the mast, which is a 15-foot length of 1¼-inch tubing, in the same manner. The mast fits into the socket of a standard rotator.

Feed Line

The RG-59/U coax feed line is fed through one end of the upper boom to a hole near the center where it emerges and then enters a hole near the top of the mast, where it is fed down through the mast to the tower. The exposed part of the coax and the feed-line connection to the driven element should be given a heavy coating of clear lacquer.

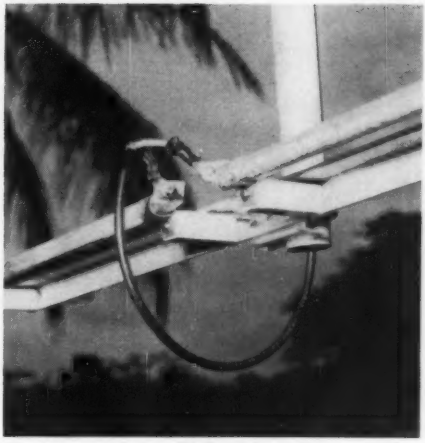
The reflector stub is made of two lengths of No. 12 or 14 wire, each about 2½ feet long, and the two wires are spaced 3 or 4 inches. The stub terminates in an insulating spreader which is guyed to the bottom of the mast so that it turns with the beam. A piece of wire is used as an adjustable shorting bar.

Adjustment

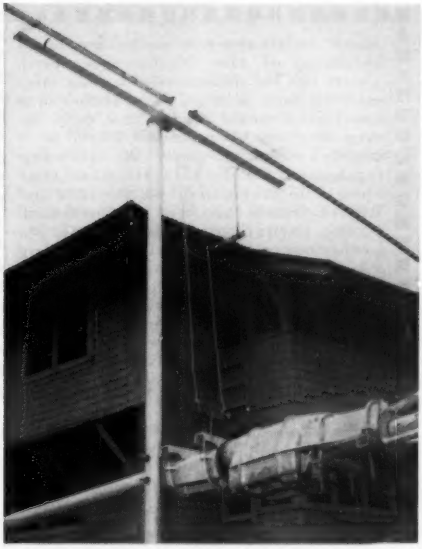
The elements were originally cut following the ratio of $251/f_{Mc.}$ found in the ARRL *Handbook*, which indicated a length of 11 feet 8½ inches for each side of the the loops for a design frequency of 21.4 Mc. The antenna was erected, with the bottom about 4 feet above ground, and the resonant frequency was checked with a grid-dip oscillator coupled to a small coil of two turns connected at the feed point in place of the coax line. The g.d.o. showed a resonant frequency of 21.6 Mc. To lower the frequency to the design figure, the lengths of the wire in the vertical sides of both the driven element and the reflector were increased by the same amount. It was found that it was necessary to increase the lengths of these sides to 13 feet 9 inches to bring the resonant frequency down to 21.4 Mc.! Apparently, the



The booms are attached to the mast by means of TV U bolts and saddles. This view shows the coax line emerging from the upper boom and entering the top end of the mast. This and other detail views were taken with the crank-over tower in lowered position.



This photo shows the mounting of the driven element on standoff insulators fastened to a length of aluminum angle. The tuning-stub side of the parasitic element is mounted in a similar manner. The RG-59/U coaxial line is fed through the boom to the mast.



The reflector stub wires terminate in an insulating strip guyed to the revolving part of the rotator.

Handbook formula does not hold for a quad of this type.[1]

After the correct length had been determined, the ends of the vertical wires were fitted with large soldering lugs for fastening to the No. 8 screws in the ends of the horizontal members. The junctions were treated with heavy clear lacquer. Then the top boom was slid upward on the mast until the tension of the vertical wires put slight bows in the horizontal tubing members. (The author has a tilt-over tower which makes it convenient to adjust the top boom. Under other circumstances, it may be more feasible to fix the position of the upper boom as high up on the mast as possible, and take up any slack in the vertical wires by adjustment of the lower boom.) Adjustment was completed by the reflector stub for minimum backward radiation as indicated on a field-strength meter.

Practical results with this antenna have been excellent. The electrical performance has come up to all expectations and the low wind resistance has contributed a great deal to the mechanical stability. QST

[1] The author's first measurement of 21.6 Mc. is in close agreement with the *Handbook* formula, since 21.6 Mc. exceeds 21.4 Mc. by slightly over 1 per cent. The increase in length to compensate is, in this case, a matter of over 10 per cent. The exact conditions under which the measurements were taken are not known, but the indications are that resonance in one element was checked in the presence of the second element which may lead to erroneous conclusions. — *Ed.*

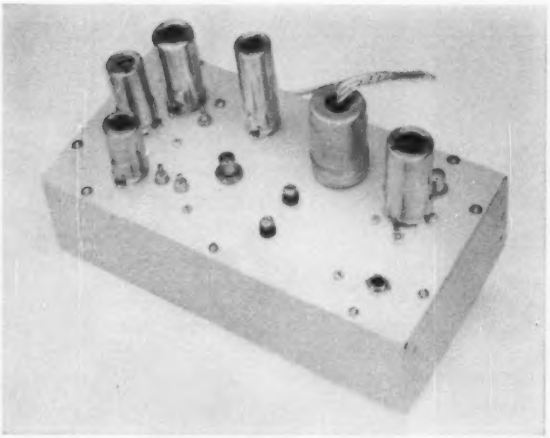
Strays

KUDOS

W2ZK has developed a method of measuring the depth of polar ice caps by using radio waves. In the course of his work with the Army he has made something like eight trips to the south polar regions.

—···—

Learning that the grandson of K1DJM was in need of blood donors before open-heart surgery could be performed in a San Gabriel, Calif., hospital, W6MLZ rounded up 20 donors in a matter of hours.



From the top, the K6AXN 1296-Mc. converter looks much like conventional designs for the v.h.f. bands. Across the upper portion of the chassis from right to left are the cascode i.f. amplifier stage and its output jack below it, the power connections shielded by means of an aluminum film can, the voltage regulator tube, and the 12AT7 crystal oscillator. At the left are the 6CY5 and 6AK5 frequency multipliers. The black nuts, center, are used for tension on the adjusting screws for the u.h.f. circuits.

A 1296 Mc. Converter Without Complications

High Performance without Surplus Parts or Plumbing

BY G. M. KRIVOHLAVEK,* K6AXN

Most amateurs are accustomed to thinking of the frequencies above about 200 Mc. in terms of highly specialized gear that only a plumber or a machinist could build, and only an engineer could operate. Here is a highly effective piece of receiving equipment for the 1215-Mc. band that should do much to dispel the idea the higher bands are not for ordinary hams. Perhaps more important, its performance may convince doubting v.h.f. men that work above 1000 Mc. has interesting possibilities.

The author is a former 1215-Mc. record holder, and one of the West Coast team in the recent successful moonbounce work on 1296 Mc.

THE converter described is the result of an effort to simplify circuits and construction of a converter for 1296 Mc. to a point where it could be duplicated with a minimum of effort, and a limited amount of equipment. It has been in use for about three years with good results, and a number of similar converters are in use in this area.

Only five tubes are used, and one of these is a voltage regulator for the crystal oscillator. One half of a 12AT7, V_{1A}, is an overtone oscillator at approximately 53.4 Mc. The second half, V_{1B}, doubles to 106.8 Mc. A 6CY5, V_2, doubles to 213.6 Mc. and drives a 6AK5 doubler to 427 Mc. The output of V_3 drives a DR303 diode, CR_1, multiplier to 1282 Mc. The 1282-Mc. energy is coupled to the mixer crystal, CR_2, along with the input signal, and the 14-Mc. difference frequency is amplified by a 6DJ8 cascode i.f. stage, V_4, and coupled with a link to the output jack.

* 3014 Groom Drive, Richmond, California.

The Injection System

The crystal oscillator is operated at low voltage and with a regulated plate supply to improve stability, a critical factor in operation at 1296 Mc. Variations in oscillator frequency that would go unnoticed at lower frequencies become disturbing at 1296 Mc., for even though the oscillator frequency is high to start with, it is being multiplied twenty-four times. Oscillator stability is improved if the crystal is not subjected to large and sudden changes in temperature. It was found that mounting the crystal inside the chassis, where it is protected from drafts, resulted in much better stability than mounting above the chassis. The three multiplier stages are quite conventional and need very little comment,

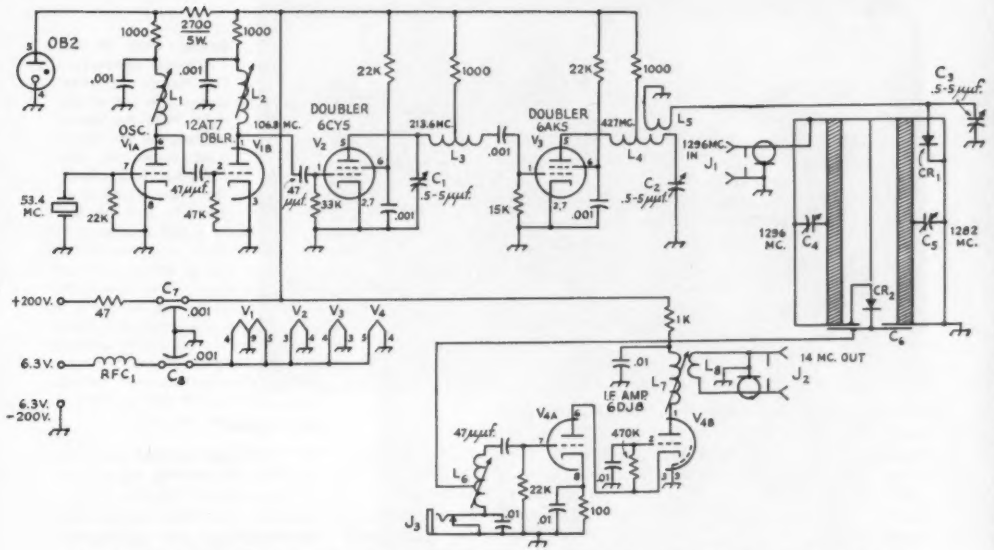


Fig. 1—Circuit diagram and parts information for the 1296-Mc. converter. Decimal values of capacitors are in μf.

C_1, C_2, C_3—0.5- to 5-μμf. plastic trimmer (Erie 532-08-OR5).

C_4, C_5—Cavity tuning screws; see text.

C_6—U.h.f. bypass: 1¾ × ¾-inch brass plate, insulated from end of r.f. assembly with .005-inch plastic film. See Fig. 2 and photograph.

C_7, C_8—0.001-μf. feed-through bypass (Centralab FT-1000).

CR_1—Multiplier diode, DR 303 or 1N82.

CR_2—Mixer diode, 1N21B, C, D, E, or MA 421B.

J_1, J_2—Coaxial fitting, BNC type.

J_3—Closed-circuit jack.

L_1—11 turns No. 22 enam. close-wound on ¼-inch iron-slug form.

L_2—4 turns like L_1.

L_3—6 turns No. 22 tinned, ¼-inch diam., ⅜ inch long, center-tapped.

L_4—3 turns like L_3, 5/16 inch long.

L_5—1 turn insulated hookup wire at center of L_4.

L_6, L_7—25 turns like L_1.

L_8—4 turns insulated hookup wire around B-plus end of L_7.

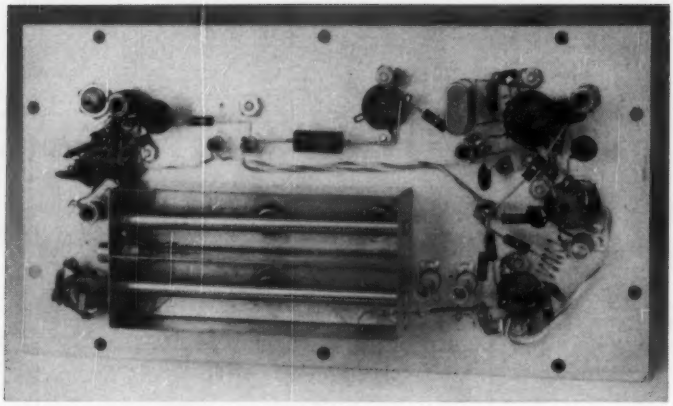
with one possible exception: Pins 2 and 7 of the 6AK5 should be grounded as directly as possible. Any stray inductance in the cathode lead seems to have a large effect on the output power of this stage.

Crystal diode multipliers may be new to some, but they provide a very simple way to get small amounts of r.f. at this frequency. When the converter was first constructed, various types of crystal diodes were tried, and the 1N82 gave the best performance. Recently, a DR303 was tried, and it gave about twice the output.

U.H.F. Circuitry

The tuned circuits at 1282 and 1296 Mc. are half-wave coaxial lines, shorted at each end and tuned capacitively at their centers. The outer conductors are formed of thin brass sheet, soldered at the joints. Dimensions are not critical, except for length, and the circuit will probably work if the length is within plus or minus ⅛ inch. The center conductors are ¼-inch brass rod, drilled and tapped at each end. The lines are tuned by 8-32 screws which provide a small variable capacitance to ground at the center of each line. A nut is soldered on the inside of each trough to provide threads, and a nylon nut (or short length of nylon rod tapped 8-32) is used on top of the chassis as a jam nut. This provides tension on the screw to give smooth tuning. The mixer crystal holder is made by soldering a ¼-inch length of ¼-inch i.d., 5/16-inch o.d. brass tubing in the 5/16-inch hole in the mixer bypass plate, then making two saw cuts across the end of the tubing at 90-degree angles to form fingers. These are bent in until they grip the large end of the crystal firmly. The mixer bypass plate is insulated by covering the side away from the crystal holder with cellophane or Teflon tape, and is mounted on the end of the trough lines with 4-40 screws and insulating shoulder washers. The holder for the small end of the crystal is a contact removed from an octal tube socket.

The antenna input connector is a UG-1094/U BNC fitting. It must be spaced up with a few ⅜-inch i.d. washers so that the threads will just reach through the chassis and the trough line with enough length for the nut. The center connection of the fitting should be cut down so that it clears the ¼-inch rod that is the trough line center conductor. If desired, a type N fitting could be used by drilling out the hole for the larger fitting. The input loop is soldered to the end of the trough line about 5/16 inch up from the



Bottom view of the 1296-Mc. converter. Oscillator-multiplier components are at the right. Note the diode multiplier in the lower right corner of the 1282-Mc. tank circuit. The mixer crystal is at the left end of the tank circuits.

bottom, and runs straight over to the input fitting. The coupling loop to the mixer crystal is soldered to the end of the trough line between the mixer crystal and the center conductor. The entire u.h.f. portion of the converter can be silver plated, if means are available, but this is not mandatory.

Filtering

The power to the converter should be filtered to prevent signals in the i.f. range from getting into the converter and back into the receiver. This is accomplished by bringing in B+ through a 47-ohm resistor and a feed-through bypass capacitor. The filament power comes through a choke wound on a 1-watt resistor and through a feed-through bypass. To cover the exposed terminals on top of the converter, an aluminum can that 35-mm. film is packaged in was used. The top was flattened by placing the top over a large dowel and hammering out the bulge. The top is then drilled for the feed-through capacitors and the terminal strip mounting screw. The top is held in place on the top of the chassis with these components. The power cable is brought in through a grommet in the bottom of the film can. The paint can be removed from the film can with lacquer thinner.

Adjustment

The oscillator and multiplier stages can be checked out as in any converter, using a grid-dip meter to tune circuits, up to the 213-Mc. stage. The output of the 427-Mc. stage can be checked by temporarily disconnecting the multiplier diode where it connects to the side of the trough line and putting a meter in series with the diode to ground. Current here should be 6 ma. or more. The diode should then be reconnected and a 0–1-ma. meter connected to the mixer current jack, J_3. The tuning screw in the 1282-Mc. trough line should be adjusted until crystal current is obtained. If the crystal current is less than 0.2 ma., solder a ½-inch long piece of wire to the contact at the small end of the mixer crystal and bend the other end near the center conductor of the 1282-Mc. line, and readjust the tuning.

Next, adjust the tuning of the 1296-Mc. line until the crystal current dips. This indicates that the input circuit is tuned to 1282 Mc. Back the screw out slightly, and you will be near 1296 Mc. Connect the converter to a receiver tuned to 14 Mc. and adjust the i.f. amplifier coils for maximum noise in the receiver. At this point you can listen for the harmonic of a 144- or 432-Mc. transmitter and peak up the input on that signal.

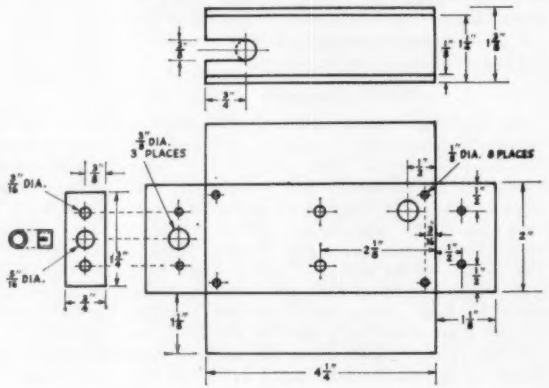
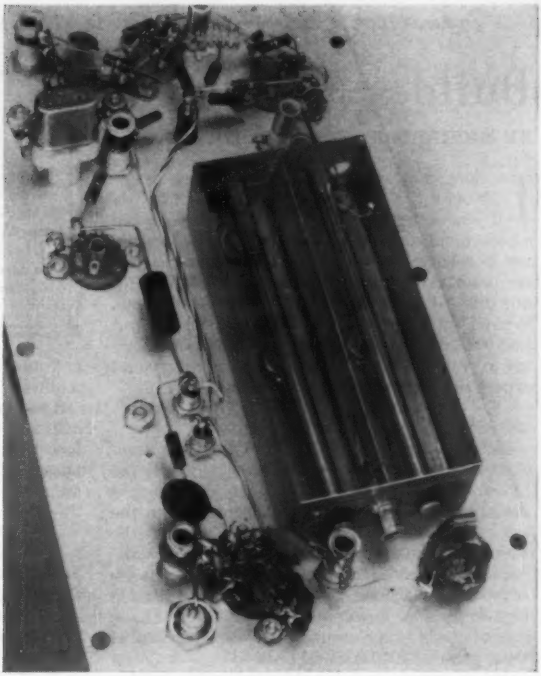


Fig. 2—Details of the sheet-metal parts of the trough-line tank circuits. The small plate at the left is insulated from the end of the trough assembly with a thin sheet of Teflon. The slot in the partition, upper portion of drawing, provides space for the mixer crystal, as shown in the photograph above.



Close-up view of the u.h.f. circuits. These are half-wave lines, tuned at their midpoints. The mixer crystal is held in place by a slotted brass sleeve, soldered to a capacitor plate on the outside of the trough. Though it is not visible in the picture, the capacitor plate is insulated from the trough end with a thin film of plastic. Screws that hold the inner conductors in position are insulated from the capacitor plate by fiber washers.

For further improvement you will need a crystal diode noise generator.[1]

With a noise generator, experiment with size and shape of input coupling and mixer coupling loops, and local oscillator injection. It may be worthwhile, also, to try different taps on the i.f. input coil. When changing mixer crystals, do not decide which is best until you have optimized these adjustments for the particular crystal in question. A 1N21E may seem no better than the 1N21B you started with, until things are peaked up for the new crystal. Then there is a difference.

It is important that the shortest possible feedline be used at this frequency. RG-8/U is commonly used, but has about 9-db. loss per 100 feet. The converter has a BNC input connector as RG-55/U cable is used between the converter and the antenna relay, a distance of three feet. From the relay to the antenna, RG-8/U is used. I also recommend that double-shielded cables such as RG-71/U 93-ohm or RG-55/U 53-ohm cable be used between converters and the receiver to keep signals at the intermediate frequency from leaking to the receiver. QST

[1] Tilton: "Noise Generators — Their Uses and Limitations," *QST*, July, 1953. Orr: "The Silicon Crystal Noise Generator," *CQ*, June, 1952.

K6AXN provided a drawing of the converter top plate which can be used as a template for drilling. Copies of this template will be sent free of charge upon receipt of a stamped self-addressed envelope. Address ARRL Technical Dept., West Hartford 7, Conn. — *Ed.*

Strays

W4NJF set up the hidden transmitter for a hunt recently staged in Norfolk, Va., hiding his car under a bunch of branches on a road that was in considerable disrepair. Within an hour four hams and the police had found him. The hams had done it legitimately, using direction finders and such, but the police got an assist from a citizen who was alarmed by the sudden influx of traffic along the narrow road. W4NJF was able to convince the law that he was a solid citizen!

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We once had an English teacher who was fond of pointing out that there are no "new" plots in literature. W2PF subscribes to this, saying that he used the idea described by K1IOX in December *QST* (K1IOX solved the space problem by mounting his gear on a tool stand which he pushes off into a corner out of the way when not in use) way back in 1936. W2PF used a tea-wagon, though, instead of the less-glamorous but more-sturdy tool stand.

—···—

WA6NNN called CQ on ten phone and then had some difficulty in figuring out who he was working — he was answered by both K9PIL and K9PYL, and it was several minutes before he discovered that he was actually working two different stations!

Transistor Code-Practice Oscillator and Keying Monitor

Build a Monilator

BY RICHARD A. EASTON,* K9OMO

The Monilator was designed and constructed at the Burris Amateur Radio Society to fill the need for a monitor and to provide a practical first project for some of the members. Using two transistors plus one diode, this economical monitor/code oscillator provides plenty of loudspeaker volume and will require no direct connection to either your transmitter or receiver.

It does not matter if your ticket reads "Novice," "General," or "Extra-Class" — if you do much c.w. operating, then you need a good monitor. As its name suggests, the Monilator is a combination monitor and code-practice oscillator. Although a beginner can build it without difficulty, this unit will not become obsolete. What is more, this handy little gadget will put you out less than ten dollars even without resorting to your junk box! This is less than you would expect to pay for most oscillators alone.

Circuit

Referring to Fig. 1, the Monilator is a transistorized Colpitts audio oscillator (Q_1) followed by a one-stage audio amplifier (Q_2) driving a loudspeaker. The use of transistors reduces the size, weight, and power requirements of the Monilator. Components C_1, C_2 and L_1 form the oscillator tuned circuit and C_3 provides the necessary feedback. Coil L_1 is the winding from a high-impedance headphone. If you don't have one of these lying around, you can get two of them from a $2.00 Allied headset.

When switch S_1 is in the oscillator position, power is provided by two pen cells, BT_1, and a key is plugged into J_1, the jack provided for that purpose. In the monitor position, diode CR_1 rectifies part of the r.f. energy radiated by your transmitter and the resulting d.c. is used to power the oscillator and amplifier circuits. A short length of wire serves as a pickup antenna and no external connections of any kind are required.[1]

The oscillator-amplifier circuit works well over a range of about one to ten volts and therefore will work properly with all normal transmitter power levels. It draws about 800 microamperes.

Construction

The Monilator is assembled in a 3 × 4 × 5-inch Minibox. Most of the details are evident in the photographs. A 3-inch speaker, the toggle switch and key jack are mounted in the flanged half of the box. A pattern of ¼-inch holes is drilled over the speaker area.

Most of the other components are mounted

* 521 Alden Road, Muncie, Indiana.

[1] Although the r.f. voltage required to operate the Monilator is much less than would be required by a corresponding tube unit, and therefore the unit will work from smaller leakage fields, in some cases where coax antenna feed is used it may be necessary to bring the end of the pickup wire an inch or two into the transmitter enclosure. This should be done with extreme caution with secure anchoring to assure that the end of the pickup wire cannot move into contact with any part of the transmitter circuit. — *Ed.*



The Monilator in use at K9LYH. Holes in the front of the box form the speaker grille.

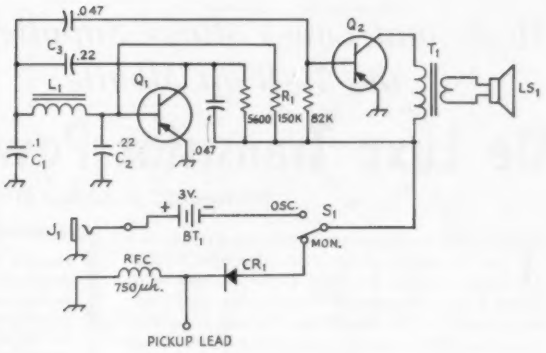


Fig. 1—Circuit diagram of the Monilator. Capacitances are in μf. and capacitors are paper or ceramic. Resistances are in ohms and resistors are ½ watt.

BT_1—Two 1.5-volt pen-light cells in series.
C_1, C_2, C_3, R_1—See text.
CR_1—Germanium diode (1N34, 1N60, 1N69 or similar).
J_1—Open-circuit jack.
L_1—Headphone winding (see text).
LS_1—3-inch p.m. speaker.
Q_1, Q_2—P-n-p transistor (G.E. or Philco 2N107, Raytheon CK722, or similar).
R_1—See text.
S_1—S.p.d.t. toggle switch.
T_1—Output transformer: 2000 ohms to voice coil (Stancor A3332 or similar).

in the other half of the box. A pair of insulating terminal strips is convenient in anchoring the small parts. To avoid as much unnecessary heating from the soldering iron as possible, the transistors and diode should be mounted last. In soldering these units in place, hold the transistor terminal lead being soldered with a pair of pliers so as to reduce the heat transmitted to the transistor. Insulating sleeving (spaghetti) should be used over leads where there is danger of contact with other wiring or components.

A 3-foot piece of hookup wire serves as the r.f. pickup. It passes through a hole in the box to the outside.

The two pen cells are mounted in clips. Before placing the cells in their clips, check the wiring very carefully to make sure that there are no mistakes or shorts. It doesn't take very much to destroy a transistor.

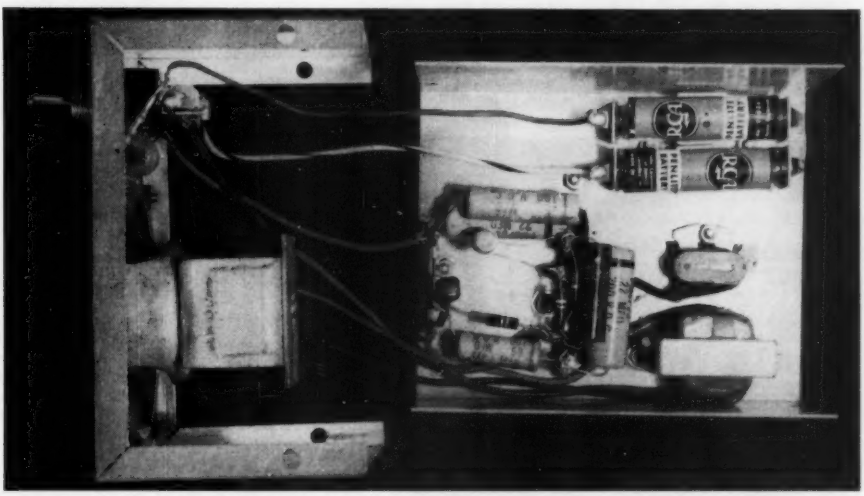
Testing and Operation

There are at least three factors affecting the Monilator's output volume and, to some extent, its operating frequency. First, the value of the r.f. or battery voltage; second, the characteristics of the individual transistors; and third, the value of R_1. This resistor may have a value of anywhere from 100K to 500K, depending upon the individual oscillator transistor.

Plug a key into the jack and place the mode switch in the oscillator position. A tone should be heard when the key is pressed. Any experimentation with the value of R_1 should be done now.

Next, set S_1 in the monitor position and place the Monilator near your rig. While keying the transmitter, try different locations of the pickup lead until you find the position that gives the best tone. If you find that you have too much

(Continued on page 134)



Interior view. The speaker, toggle switch, key jack, diode rectifier and r.f. choke are mounted in the section to the left. The transistor immediately below the upper pair of stacked capacitors is the oscillator. The amplifier transistor is mounted on the terminal strip at the left. The headphone winding used as the oscillator inductor is to the right, between the pen-light cells and the output transformer.

High- and Low-Voltage Supplies for the 50-Watt Mobile

De Luxe Transistor Power Converters

BY ROBERT L. KARL,* W8QFH

Here's a mobile double feature — independent 250- and 600-volt transistor power supplies for the low- and high-level stages of a 50-watt transmitter. Both use separate high permeability transformers for feedback and voltage step up, and both include such features as kick-start circuitry and transient limiting.

THE dual mobile power supply shown here is a further development of one described by the author in *QST* for June, 1958.[1] We wanted to power a fully modulated 50-watt a.m. signal under actual mobile conditions. In our case, this meant an input voltage (at the car trunk which ranged from 11.5 to 12.25 volts at full load and varying engine speeds. The original supply was efficient and reliable, but it did not quite reach our target. In addition, the output voltage dropped under modulation, affecting the v.f.o. stability and varying the drive to the final.

To cope with this, two new power supplies were developed. One takes care of the low-level stages, and the other is for the final amplifier and the Class AB_2 modulator. The low-level section delivers between 240 and 250 volts at 125 ma. The output of the high-voltage section is 590 volts at 120 ma. and drops to 570 volts during voice peaks when the drain is 225 ma.

About the Circuit

Like the original supply, both new ones are of the separately excited variety; that is, they use high-permeability toroids, T_1 and T_3 in Fig. 1, for feedback and separate Hypersil step-up transformers, T_2 and T_4.[2] With these core materials, no waveform despiking is required.

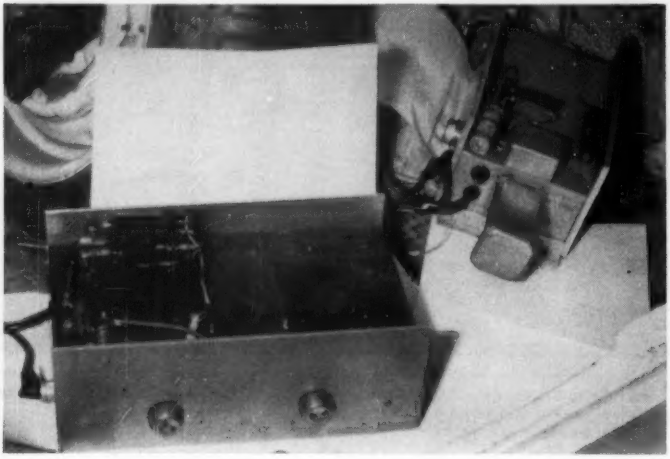
The high-voltage section uses two pairs of paralleled 2N278 transistors. The 0.1-ohm emitter resistors force the transistors to divide the current evenly. Higher-value resistors would do even better in this respect but would also increase the losses. Pairs of matched transistors are available at somewhat higher cost; if these are used, the matched units should be paralleled, and the 0.1-ohm resistors can be omitted. In our particular supply the transistors used are all different, but the emitter resistors keep the currents within 12 per cent of each other.

CR_1 and CR_2 are clamping diodes operating with R_8 and C_1 to protect the transistors from transient voltage peaks coming from the car circuits (not to be confused with spikes). T_1 has taps for using Zener diodes to accomplish the same thing more efficiently, but the method shown is less expensive. The L_1C_3 filter in the battery lead also helps isolate the supply from disturbances in the car's electrical system and keeps

* 22060 Charter, Southfield, Michigan.

[1] Karl, "100-Watt Transistor Mobile Power Supply," *QST*, June, 1958.

[2] The transformers specified in the parts list can be obtained from the Osborne Transformer Co., 3834 Mitchell, Detroit 7, Mich. Prices (F.O.B. Detroit) are as follows: No. 2709, $8.00; No. 16553-12, $16.70; No. 716, $6.50; No. 14572A-12, $9.90.



The high- (left) and low-voltage supplies pulled out for inspection in the trunk of W8QFH's car. The transistors are mounted on aluminum plates which are fastened to the chassis sides.

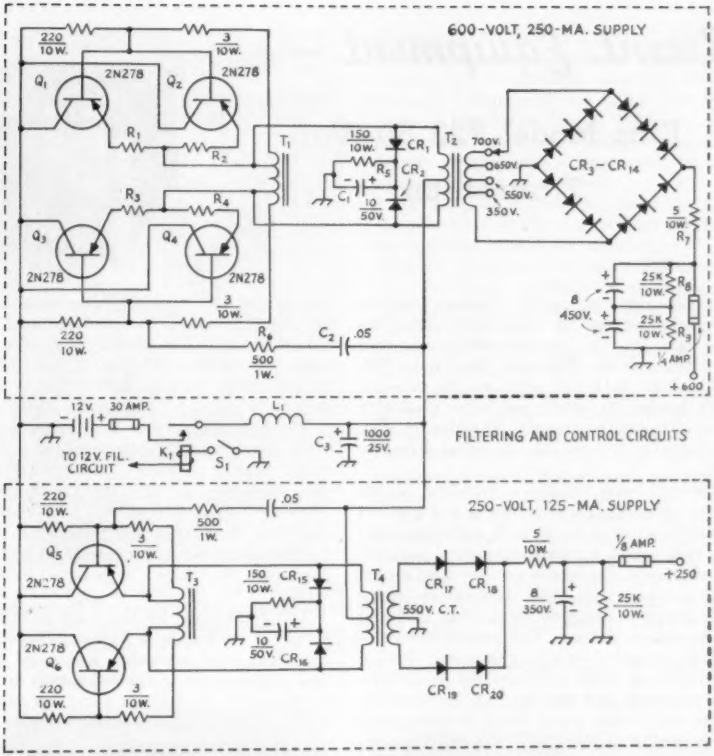


Fig. 1—Circuit of the dual power supply. The high- and low-level sections are diagrammed above and below the common filtering and control circuitry. The hookup shown is for a negative-ground car electrical system; the changes necessary when the positive side of the battery is grounded are covered in the text. Resistances are in ohms, and capacitances are in μf. Capacitors marked with polarity are electrolytic; others can be paper or ceramic.

C_1—50-volt electrolytic.
C_2—200-volt paper.
C_3—25-volt electrolytic.
CR_1, CR_2, CR_{15}, CR_{16}—70-volt, 625-ma. silicon diode (Sarkes Tarzian 10M).
CR_3–CR_{14} inc., CR_{17}–CR_{20} inc.—400-volt peak inverse silicon diode (Texas Instrument 1N2070).
K_1—S.p.s.t. relay, 12-volt coil, 30-amp. contacts (Potter and Brumfield MB3D suitable).
L_1—20 turns No. 10 enamel close-wound on ½-inch diameter hardwood dowel.
R_1–R_4 inc.—0.1 ohm (see text).
R_5 R_7–R_9 inc.—10-watt wire-wound.
R_6—1-watt carbon.
S_1—Push-to-talk or other control switch.
T_1—Toroid feedback transformer (Osborne No. 2709).
T_2—Power transformer with Hypersil core; secondary tapped for 700, 650, 550 or 350 volts, 325 volt-amp. (Osborne No. 16553-12).
T_3—Toroid feedback transformer (Osborne No. 716).
T_4—Power transformer with Hypersil core; secondary 550 volts c.t., 129 volt-amp. (Osborne No. 14572A-12).

transistor hash from getting into the receiver.

Since the power supply is completely shut off during standby periods it must start under full load. The 220- and 3-ohm resistors bias the transistor bases so as to encourage oscillation, and R_6C_2 is a kick-starting circuit used to ensure good starting characteristics. When the supply is turned on, this network feeds a positive voltage pulse to the bases of Q_3 and Q_4 so that they will not conduct and Q_1 and Q_2 will. If the supply is heavily overloaded, the circuit will not oscillate in spite of the kick-start arrangement and the separate excitation. As a safety precaution, however, both input and output circuits should be fused as shown.

Silicon diodes are used in the bridge rectifier since they require no filament power and have a lower voltage drop than vacuum-tube rectifiers. R_7 limits the current drawn through the diodes by the filter capacitance. R_8 and R_9 divide the output voltage across the 8-μf. electrolytics and serve as a bleeder resistance in case the load is accidentally removed or the fuse blows.

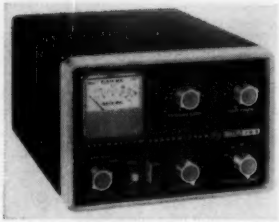
Positive or Negative Ground

In these power-supply circuits the collectors (which are connected to the outer shells of the 2N278s) are connected to the negative side of the battery. When the negative side is grounded as in Fig. 1, the transistors can be mounted directly on a grounded metal surface. With a

(Continued on page 134)

• Recent Equipment —

Eico Model 723 60-Watt Transmitter



EICO, once again employing a modern motif in decoration as used on their Model 720,[1] has now brought out a lower-power transmitter with a simpler circuit. This unit, the Model 723, is capable of 60 watts c.w. input on the amateur bands 80 through 10 meters and, when used with an external modulator, nearly 50 watts on a.m. The transmitter is available in either wired or kit form.

The general color scheme is two-tone brown with silver lettering. Light brown or tan outlines a dark brown panel in the form of a die-cast bezel frame which makes a tight-fitting joint between panel and chassis. The knobs are also light brown but with a white trim. The dark brown wrap-around cabinet is designed to provide shielding against harmonic leakage. The transmitter components are mounted on a copper-plated chassis.

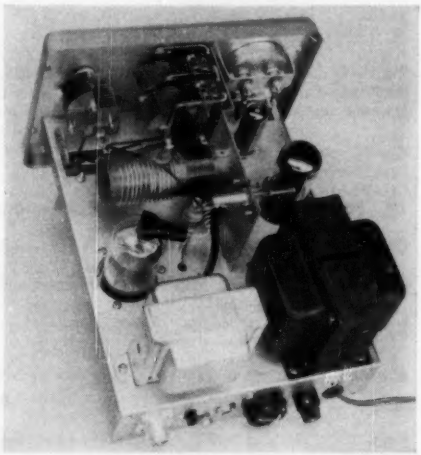
The equipment comes very carefully packed as a kit. Our particular unit was found to be complete except for a few minor parts, which in the writer's case were junk-box items, and was easily assembled with a few tools and a soldering iron. The assembly booklet is clear and easy to follow, with the pictures and text fairly well correlated. Roughly, 15 hours of leisurely work were required for assembly.

There are only two tubes in the r.f. section, a 6CL6 electron-coupled grid-plate-type crystal oscillator driving a 6DQ6B final amplifier. The oscillator plate-tank circuit is simultaneously band-switched with the final amplifier pi network. The oscillator plate tank circuit resonates at the output frequency on all bands except ten meters, where it tunes to 14 Mc. and the final amplifier doubles to 28 Mc. In the 80- and 40-meter positions the grid circuit is loaded down with an 8200-ohm resistor for broad-banding. This feature is useful when an external v.f.o. is used to replace the crystal. The v.f.o. may be plugged directly into the crystal socket, but the instruction manual does not say how much power is needed from it. The five amateur bands are covered with the usual combinations of 80- and 40-meter crystals.

The 6DQ6B final amplifier is a power pentode operated as a straight-through Class C amplifier on all bands except ten meters, as previously explained. A capacitive-bridge neutralizing circuit is incorporated to insure stable operation. Stability is further insured by a 22-ohm resistor at the grid of the 6DQ6B. The pi-network tank circuit can match the final amplifier to loads between 50 and 1000 ohms. If additional loading capacitance becomes necessary, there is a 1000-$\mu\mu$f. capacitor which can be paralleled with the normal loading capacitance by means of a slide switch on the rear apron of the chassis.

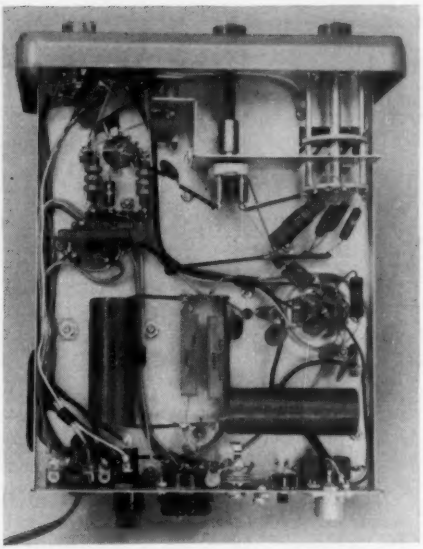
The power supply is a full-wave, choke-input type providing 500 volts through a GZ-34 indirectly heated rectifier. This tube is the European version of the 5U4GB. The choke is a 5-to-25-henry swinging type and is used in conjunction with two 40-μf. electrolytics in series. All sockets and jacks are bypassed to attenuate any harmonics that might be radiated by connecting cables.

The B-plus line for the final plate and screen supply is connected to two terminals on a rear-mounted octal accessory socket so that plate modulation may be applied simply by introduc-



The general component layout of the Eico 723 transmitter is compact but not crowded. The oscillator and rectifier tubes are to the right of the partition in this photograph while the 6DQ6B amplifier and its associated circuits are to the left. The oscillator tube is directly behind the meter. The power transformer is at the right foreground and the filter choke is to its left. The neutralizing capacitor for the final amplifier is mounted on the partition with its adjustment screw extending out between the power transformer and the rectifier tube. Connections along the rear apron from left to right are: r.f. output connector, auxiliary loading capacitance slide switch, grounding stud, key jack, octal accessory socket, fuse, and line cord.

[1] "Recent Equipment," *QST*, July, 1959.



Bottom view of the Eico 723 transmitter. The oscillator and function control circuits are located in the upper left hand corner of the photograph. The amplifier grid coils are attached to the band-switch wafers at the upper right. Immediately below the grid coils is the amplifier tube socket and its related components. The amplifier socket is recessed into the chassis to allow the top of 6DQ6B amplifier tube to clear the cabinet.

ing suitable modulation power through the terminals. These terminals are shorted by a jumper in an octal plug which is kept in the socket when there are no accessories in use. Fifteen milliamperes at 500 volts and 600 ma. a.c. at 6.3 volts is available at this socket to power accessories such as a v.f.o. The terminals also afford a convenient place for applying emergency power from an external source. When using such an emergency supply, the 6.3-volt winding on the power transformer is disconnected from the tube heaters, the connection normally being made through a jumper in the octal plug mentioned above. Connections for 117 volts a.c., energized only in the "transmit" position of the function switch, are available at the socket for operating an antenna change-over relay.

Keying is done through a normally closed key jack (located on the chassis rear) which controls the cathodes of both the oscillator and amplifier. This, of course, allows full break-in operation. One drawback, however, is that even though care has been used in stabilizing and isolating the oscillator, a slight chirp is noticeable on 20 meters and there is rather pronounced chirping on 15 and 10 meters.

A TUNE position on the function switch grounds the screen of the 6DQ6B to prevent excessive plate current flow when the grid circuit (oscillator plate tank) is being tuned. A two-position meter switch allows measurement of final amplifier cathode current.

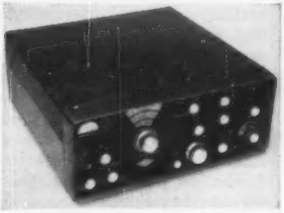
A.c. line-power consumption for the transmitter is about 140 watts under key-down conditions. A 5-ampere fuse is mounted on the rear apron for protection of the equipment. The assembly manual includes a trouble-shooting chart, voltage and resistance charts, and operating instructions.

—A. G. D.

Model 723 Transmitter

Height: 6 inches
Width: 8½ inches
Depth: 9 inches
Weight: 15 pounds
Power requirements: 140 watts, 117 volts, 60 cycles.
Price class: $50.00 (kit), $80.00 (wired).
Manufacturer: Eico Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, New York.

Gonset G-76 Multiband Transceiver Model 3338



THE G-76 transceiver is a compact transmitter-receiver about one foot long and one-half foot high, designed for either fixed or mobile operation with both an a.c. or d.c. power supply available. It covers the six amateur bands from 80 through 6 meters. Although called a transceiver because it does have some audio stages common to both the transmitter and receiver, the G-76 contains a separate transmitter and receiver which may be operated independently and on separate frequencies. There is no provision for automatic transmitter-receiver tracking. The transmitter is either v.f.o. or crystal controlled, except on 6 meters, where it is strictly crystal controlled. It operates with a power input of 120 watts on c.w. and 100 watts on a.m. The receiver is dual conversion, and contains a stable b.f.o. for c.w. or s.s.b. reception.

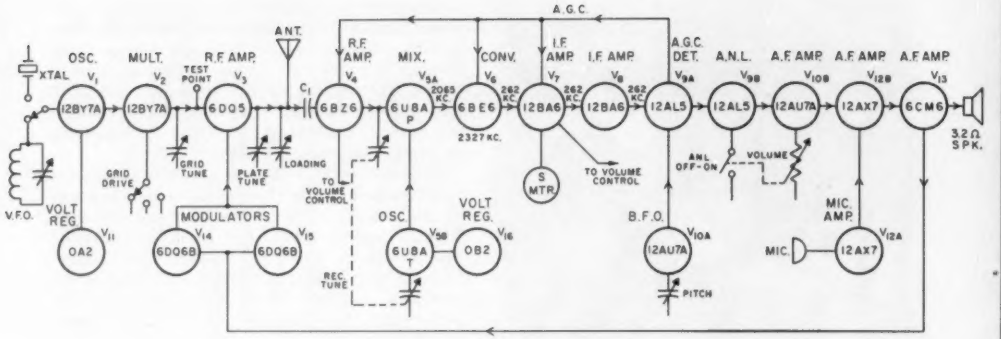


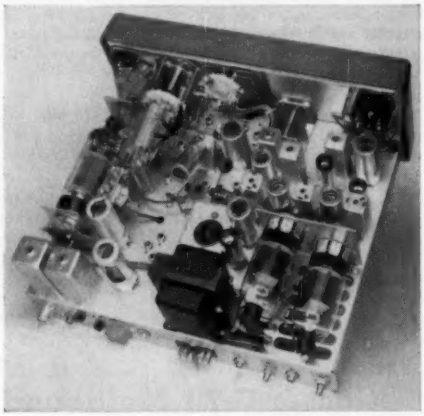
Fig. 1—Block diagram of the G-76 transceiver.

The block diagram in Fig. 1 shows the tube line-up and functions. The receiver portion of the transceiver is to the right of the antenna in Fig. 1. It is strictly a ham-band receiver and tunes the six amateur bands between 80 and 6 meters. Starting off with a 6BZ6 r.f. amplifier, V_4, it uses the transmitter's plate tank circuits for its input tuned circuits.[1] With this arrangement, the receiver's front end is always peaked at the same frequency as the transmitter operating frequency. The setting of the transmitter's final plate tuning and antenna loading controls is actually quite broad for receiving and, when set for proper transmitter operation on a particular frequency, do not need to be readjusted to tune the receiver over the entire band. The input voltage to the receiver's r.f. stage is stepped down to a safe level when transmitting by means of a capacitive voltage divider composed of C_1 in Fig. 1 and the input capacitance of V_4.

To change bands for both transmitting and receiving, it is necessary to turn two panel band switches. The transmitter output circuit (and thus the receiver r.f. amplifier tuned circuit) is switched from band to band by one switch having five positions, with the 15- and 10-meter bands combined in one. A second six-position main BAND switch controls the transmitter's oscillator and multiplier tuned circuits, as well as the receiver's mixer-oscillator circuits. It is impossible to transmit accidentally on one band while receiving on another, but by the same token, cross-band work is ruled out.

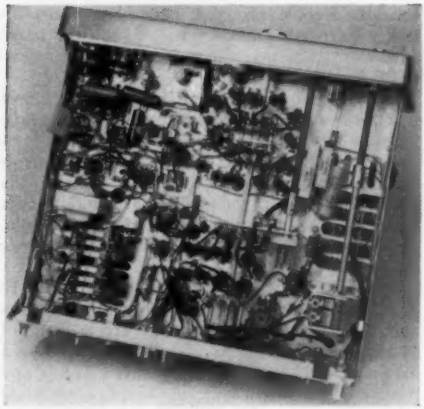
Following the r.f. amplifier is the pentode section of a 6U8A, V_{5A}, which functions as a mixer to convert the incoming amateur-frequency signal to the first i.f. of 2065 kc. The proper injection is furnished by the triode section of the same 6U8A, V_{5B}. The oscillator frequency is controlled by a variable capacitor which, along with another capacitor in the plate circuit of the mixer, is operated by the tuning control on the front panel. This main receive tuning dial is a calibrated rotating disk stepped down in an 8-to-1 ratio by a planetary vernier on the tuning control. Temperature compensation, along with regulated plate voltage, contributes to the electrical stability of the local oscillator. A panel DIAL set knob allows for minor corrections of dial calibrations by adding or subtracting capacitance from the oscillator's tuned circuit.

The 2065-kc. signals are converted to the second i.f. of 262 kc. in the 6BE6 converter, V_6. Its regulated screen voltage is supplied by the same line that supplies the oscillator plate voltage. The combined stability of the oscillators is such that plate or filament voltage excursions of



This view of the G-76 shows the compact arrangement of the various components. The audio stages are grouped along the bottom right of the photograph with the two 6DQ6B modulator tubes mounted horizontally on a bracket. Final-amplifier circuits are at the top left. The 6DQ5 final amplifier is also mounted horizontally. Just to the right of the tapped coil in the final amplifier tuned circuit is the receiver's r.f. amplifier, a 6BZ6, mounted on a bracket at an angle of about 45 degrees. The large transformer at the bottom of the picture is the modulation transformer, and the empty socket just above it is for a crystal calibrator, an accessory which is not furnished with the equipment. Connections and controls along the rear apron, from left to right, are the coaxial antenna connector, key jack, final amplifier grid current test point, crystal/v.f.o. switch, crystal socket, power connector, microphone jack, microphone gain control, speaker jack, and S-meter zero-set control.

[1] Sabaroff, "A Novel Electronic Transmit-Receive Switch," *QST*, June, 1957.



Getting six bands, both transmitting and receiving, in a small package requires crowding under the chassis, as is evident in this view of the G-76. The postage-stamp-shaped object at the upper left of the photograph is a printed-circuit noise limiter.

30 per cent decrease or 50 per cent increase can be tolerated even when in the s.s.b /c.w. mode.

Two stages of 262-kc. i.f. amplification are used in the receiver. Included in the first i.f. amplifier circuit are the S meter and a portion of the volume control circuit. Selectivity is rated at 3 kc. at 6 db. down, and 14 kc. at 60 db. Image rejection of the receiver is stated to range from 70 db. on 80 meters to 30 db. on six meters.

A section of a 12AL5, V_{9A}, functions as a detector and develops a.g.c. voltage. The other diode section, V_{9B}, is used as an automatic noise limiter and can be turned on and off from the front panel by a push-pull switch which is ganged to the volume control shaft. For s.s.b./c.w. reception, a b.f.o., V_{10A}, is provided and its frequency can be tuned from the front panel by the b.f.o. PITCH control. The PITCH control is marked "L" and "U" to indicate the approximate settings for lower- and upper-sideband reception.

Low-level audio from the detector is amplified in the a.f. amplifiers V_{10B}, V_{12B} and V_{13}. In the receive position, audio is fed to the speaker jack at the rear of the cabinet. Audio output is rated at 2½ watts.

A receiver control not mentioned previously is the function switch with four positions: CAL (for a crystal-controlled calibrator not furnished with the G-76), A.M., S.S.B./C.W. and CAL. In the first CAL position (adjacent to the A.M. position), the calibrator is turned on, the b.f.o. is switched off, the a.v.c. is operating and the volume-control circuit consists of a gain control in the a.f. amplifier circuit. In the A.M. position, the same conditions exist, except that the calibrator is off. In the S.S.B./C.W. position, the b.f.o. is turned on, the a.v.c. line is grounded and the volume-control circuit includes the audio gain control and also a sensitivity control which is ganged to the volume-control shaft. The sensitivity control is in the cathodes of the r.f. amplifier and first i.f. amplifier. The remaining CAL position repeats the S.S.B./C.W. conditions with the calibrating oscillator on.

The Transmitter

The transmitter portion of the G-76 can be either crystal- or v.f.o.-controlled on bands 80 through 10 meters. The v.f.o. does not operate on 6 meters, however, so crystal control must be used. A slide switch at the rear of the chassis allows for switching from v.f.o. to crystal. Also on the rear apron is a dual crystal socket. One low-frequency crystal and one crystal for six-meter operation can be placed in the socket and the proper one will automatically be selected when bands are switched from the front panel. However, crystals for six-meter operation may be inserted in the crystal socket and selected by the rear v.f.o./crystal switch. For six-meter operation, 8334–9000-kc. crystals are required. Crystals usable on the low frequencies are as follows: 80 meters, 1.75 or 3.5 Mc.; 40 meters, 1.75, 3.5 or 7 Mc.; 20 meters, 3.5 or 7 Mc.; 15 meters, 7 Mc.; 10 meters, 7 Mc.

For v.f.o. control, the 12BY7A Colpitts oscillator, V_1, operates on one of two ranges. On 80 and 40 meters, the range is 1.75 to 2.0 Mc., and on 20, 15 and 10 meters, 7.0 to 7.425 Mc. is used. The v.f.o. is tuned by a planetary vernier control on the front panel. The oscillator tube has regulated screen voltage to insure good stability.

Output from the v.f.o. is multiplied to the desired final frequency by the 12BY7, V_2. Output from this stage is controlled by a front-panel grid DRIVE switch which varies the screen voltage on V_2. The plate circuit of the multiplier is tuned by the front panel GRID control.

There is a test point at the chassis rear for monitoring final-amplifier grid current. Grid current can be metered with the panel meter, but not when the final amplifier is actually operating. This is because of the way in which the meter is controlled, along with other circuits, by the panel transmitter function switch. The switch has five positions: In the FIL OFF position the transmitter filaments are turned off to reduce heater drain when receiving. The TUNE position applies voltage only to the oscillator, V_1, and multiplier, V_2; in this position the panel meter (which also doubles as the S meter on receive) indicates final-amplifier grid current. Position three of the function switch is LOW power. In this position the screen voltage on the final r.f. amplifier, V_3, is reduced so that plate tuning and loading may be adjusted safely. The meter indicates final-amplifier cathode current. In the LOW position, the transmitter can be operated at about 20 watts input (which gives extra points on Field Day!). The next position is HIGH power, where full voltage is applied to the final amplifier and modulator. The panel meter reads final-amplifier cathode current. In the last position, c.w., voltage is removed from the modulators and the modulation transformer secondary is shorted out. Here again the meter indicates final-amplifier cathode current.

A 6DQ5, V_3, is used in the G-76 as the final r.f. amplifier. It can be operated with inputs up to 120 watts on c.w. and 100 watts on a.m. The pi-network output circuit has the usual PLATE and LOADING panel controls. Measurements on the unit we tested showed outputs ranging from 54 watts on 4 Mc. to 38 watts on 28.6 Mc. and 30 watts on 52 Mc., with about 100 watts input. In the c.w. mode, the cathode of the r.f. amplifier is keyed. The key jack is located at the rear of the chassis.

On a.m., Class B 6DQ6Bs, V_{14} and V_{15}, modulate the plates and screen of the r.f. amplifier. The tubes are operated in a way that resembles the old "space charge" tetrode circuit, with the control grid tied to cathode, and the signal applied to the screen grid. This arrangement gives less distortion than the conventional tetrode circuit but requires some driving power. A rear-apron MIC GAIN control compensates for different microphone output levels. The microphone jack is also located at the rear of the chassis. Preamplification for a high-impedance microphone is provided by V_{12A}. Stages also common to the receiver audio, V_{12B} and V_{13}, give additional amplification for the microphone. The audio stages common to both transmitter and receiver are shifted from one mode to the other by the send-receive switching system.

Other controls include the SPOT toggle switch, which turns on the v.f.o. for zero beating. The transmitter will not operate when the SPOT switch is turned on; this protects the final amplifier in case the v.f.o. frequency is moved some distance from where the final amplifier is tuned. The main SUPPLY toggle switch turns on the external power supply. The transmit-receive toggle switch controls a multicontact relay which switches the various send-receive circuits. Transmitter high voltage from the power supply is not present in the transceiver when the relay is in "receive," being disconnected by another relay, in the power supply itself, controlled by the send-receive relay. A microphone push-to-talk switch, which is in parallel with the panel t.r. switch, can also be used for going from transmit to receive.

With such a compact unit as the G-76, Gonset has tried to arrange the panel controls for maximum operating convenience. Except for the receiver band switch, all of the receiver controls (and the send-receive switch) are grouped to the left of the panel. If the equipment is mounted in the usual spot in the center of the automobile, this panel layout would put the receiver controls within easy reach of the driver.

The lip of the wrap-around cabinet of the G-76 extends out of the front panel by about 1 inch and, unless the operator is directly in front of and level with the transceiver's front panel, the overhang hides some of the control labels and receiver dial calibrations. However, most amateurs who drive while operating become accustomed to the various controls and don't find it necessary to move their eyes from the road while they are tuning.

The 34-page instruction manual furnished with the G-76 includes a schematic diagram, voltage charts, parts list, and operating and alignment instructions. However, the manual contains no information on theory of operation or circuit analysis. — *E. L. C.*

G-76 Transceiver

Height: 5⅛ inches.
Width: 12⅝ inches.
Depth: 11½ inches.
Weight: 16 lb., 4 oz.
Power requirements: 12.6 volts a.c. or d.c. at 4.7 amperes, 225–275 volts d.c. at 90 ma., and 500–625 volts d.c. at about 250 ma.
Price class: $375.00.
Manufacturer: Gonset Division, Young Spring & Wire Corp., Burbank, California.

G-76 A.C. Power Supply (Model 3349) and D.C. Power Supply (Model 3350)

Two separate power supplies, an a.c. and a d.c. model, are available for furnishing operating power to the G-76. The a.c. model uses both semi-conductor and vacuum-tube rectifiers and includes a speaker and phone jack on its cabinet panel. When phones are inserted in the phone jack, the speaker is automatically disconnected. The cabinet matches the G-76 and can sit side-by-side with the transceiver without looking out of place. In addition to furnishing the two necessary high voltages, this supply also furnishes 12.6 volts a.c. for filament power. It is protected by two fuses in the a.c. plug and by a 750-ma. fuse wired in series with the center tap of the power transformer. This fuse is conveniently mounted on the rear apron of the chassis for easy access.

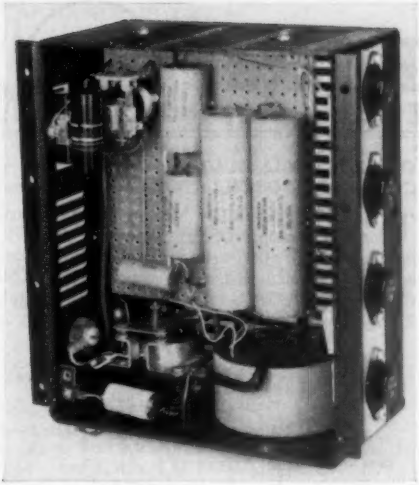
The d.c. power supply (see photograph) is a

Model 3349 A.C. Power Supply

Height: 5⅛ inches.
Width: 12⅝ inches.
Depth: 11½ inches.
Power requirements: (Transmit) 117 volts a.c., at 3 amperes; (Receive) 117 volts a.c. at 1.5 amperes.
Price class: $150.00.

Model 3350 D.C. Power Supply

Height: 3½ inches.
Width: 8 inches.
Depth: 6½ inches.
Weight: 5 lb., 2 oz.
Power requirements: (Transmit) 13.4 volts d.c. at 22.5 amperes; (Receive) 13.4 volts at 10 amperes.
Price class: $150.00.



View of the G-76 d.c. power supply. The four power transistors are mounted on the side of the aluminum case, at the right in this view. The toroid power transformer is at the bottom right. The cover plate has been removed in this photograph.

transistor power converter which uses four power transistors in push-pull parallel. Semiconductor rectifiers are used throughout. The supply is small (compare its dimensions with those of the a.c. unit) and is designed for easy mounting in the mobile vehicle. A 30-amp. fuse and holder is furnished with the supply and protects the vehicle and equipment. There's plenty of filtering in the power-supply circuit and it's impossible to detect any whine in the transceiver's audio circuits. However, the supply does give off the characteristic acoustical singing of a transistor power supply. One unfortunate feature of the d.c. supply is that it can only be used with a negative ground system. — *E. L. C.*

Technical Topics

A.G.C. for Sideband and C.W.

A "TECHNICAL Correspondence" letter [1] by Mr. Cranfield prompted a review of the Woods article [2] and that triggered off a letter to George Luick, WØBFL. Reason for all the action was a "hang a.g.c." circuit for sideband [3] based on rectified i.f. that George improved [4] by using rectified audio instead of i.f. The letter inquired of WØBFL if he had run into any of the troubles recounted by Woods, since they hadn't shown up in the rectified-i.f. version. Here is the reply:

"I have received numerous letters from fellows who have tried out the audio-hang a.g.c. and have 'improved' on it. One even went so far as to say he improved his by putting a 100K resistor from the a.g.c. bus to ground. Of course, he missed the whole point of the circuit. Woods' circuit looks to me like it would operate exactly like the conventional a.g.c. in commercial receivers, except that it is audio driven.

"I have been using mine for over three years now, and I have not experienced a single tube in the controlled stages that exhibited any leakage to ground from the grid. I have found several 12AU7s and 12AT7s that have too much leakage to be used as discharge triodes. However, it is easy to find a good one, and the S meter shows absolutely no fade from peak reading. It is entirely possible that with no signal and the antenna disconnected there will be a slight positive potential on the a.g.c. line, from contact potential, but that voltage is to ground and can never be positive to cathode, since increased plate current will automatically increase the bias developed by the cathode bias resistor. Thus the effect cannot possibly be harmful.

"Just received my third Christmas card from VK6HC, who used our circuit and is very pleased with it. Shortly after the article, heard G2MA describing his homemade receiver with an audio hang-a.g.c. circuit that he described as 'fantastic;' called in and he said he had it installed within four days after receiving his *QST*.

"I built the a.g.c. circuit in a small Minibox, to fit into a 75A-4 right behind the PTO, with a cable that runs through a hole in the chassis to connect on the audio-output tube socket for voltages. Some models have a 330K resistor from a.g.c. bus to ground that must be disconnected. Used it on two A4s and it worked fine except that the attack time was too long, and a really strong signal would cause 'over-throw' and pop when the signal started. These were not my receivers so could not modify them, but I figured it was caused by the time constant being too long in the isolating filters in the grid returns of each controlled stage. In my own receiver I long ago substituted small r.f. chokes for the 10K isolating resistors, and I have absolutely no over-throw or pop. That is the only improvement I have been able to make in three years."

The diode suggested in Mr. Cranfield's letter was used for bias application by WØBFL, as pointed out in the original article. — *B. G.*

[1] "Fixed Bias with Audio A.G.C.," *QST*, January, 1961.
[2] Woods, "An Improved Audio-Driven A.G.C. Circuit," *QST*, September, 1960.
[3] Goodman, "Better A.G.C. for S.S.B. and Code Reception," *QST*, January, 1957.
[4] Luick, "Improved A.G.C. for Sideband and C.W.," *QST*, October, 1957. See also, *Single Sideband for the Radio Amateur*, page 91.

Hints and Kinks For the Experimenter

FLY-WHEEL TUNING

I HAVE incorporated fly-wheel tuning in my Knight R100 receiver without even removing the cabinet. The idea could probably be adapted for almost any receiver. Remove the large main tuning knob. Fill this hollow (cup shaped) knob with lead shot, glue the shot in place and add a plastic back. With this arrangement, the "feel" of the tuning is much improved.

— *Henry L. Wyatt, K4YCR*

BLACK CRACKLE BRIGHTENER

DISCOLORATION and mars on black crackle finish can be covered up by painting the finish with black shoe dye. The dye does not fill in the crackle regardless of the number of times it is applied. The dye does not rub off, however, so be careful to keep it clear of surfaces that you do not want covered!

— *Don Hutchin, K3DMZ/Ø*

USING VOX FOR AUTOMATIC CHANGE-OVER ON C.W.

FIG. 1A shows a simple way to add automatic change-over on c.w. to almost any transmitter equipped with VOX. When the keying relay RL_1 is closed it keys the transmitter and at the same time ungrounds the coil, L_1, which is a few turns of wire wrapped around the a.c. line cord. The coil, L_1, picks up some a.c. voltage from the line cord and this voltage is connected to the transmitter's microphone input where the "hum" triggers the normal VOX system. With key up, the relay opens, and coil, L_1, is shorted to ground. This turns off the VOX and returns the station to receive. By adjusting the transmitter's VOX controls, the desired amount of delay between change-over can be set.

To simplify the phone-c.w. switching, the arrangement in Fig. 1B is used. This scheme automatically removes the c.w. change-over system and grounds the key terminal of the transmitter when in the phone mode.

— *Harry J. Gensler, jr., K8OCO*

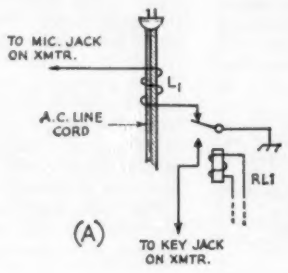


Fig. 1—System for using VOX as an automatic change-over system for c.w.
L_1—2 or 3 turns of wire around the a.c. line cord.
RL_1—S.p.d.t. keying relay.
S_1—D.p.d.t. switch.

ONE-CRYSTAL MULTIBAND CONVERTER-OSCILLATOR

THE oscillator circuit by Murray in "Technical Correspondence," *QST*, May 1960, page 51, reminded me of one I used in a crystal-controlled converter which tuned all the amateur bands 80 through 10 meters and used only one crystal. A suggested oscillator circuit is shown in Fig. 2.

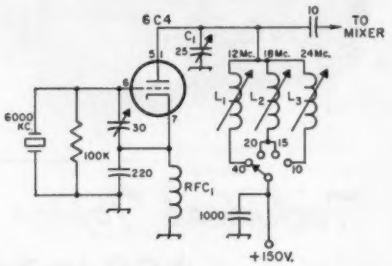


Fig. 2—Single-crystal oscillator for multiband converter. Capacitances are in $\mu\mu f$.
L_1—9 μh. slug-tuned coil (Miller 40A826CB1).
L_2—4 μh. slug-tuned coil (Miller 40A336CB1).
L_3—2 μh. slug-tuned coil (Miller 40A226CB1).
RFC_1—2.5 mh. r.f. choke.

It uses a 6-Mc. crystal, is used in conjunction with a conventional bandswitching converter, and is fed into a BC-454 Command set receiver. The frequency relationship of the crystal-controlled oscillator and the receiver tuning range is as follows:

BAND (meters)	OSCILLATOR OUTPUT FREQ. (Mc.)	RECEIVER TUNING RANGE (Mc.)
40	12	5.0–5.3
20	18	4.0–4.35
15	18	3.0–3.45
10	24	4.0–5.70

Inductors L_1, L_2 and L_3 along with C_1 should be resonant at the indicated frequencies.

— *Jackson L. Cox, WØKMV*

CAPACITOR CHECKER

THE capacitor checker shown in Fig. 3 can be constructed in a few minutes and requires only a few parts. Good capacitors will show a single flash from the neon indicator. Small-value units will give a less brilliant flash than large-value ones. If the lamp glows steadily, the capacitor is shorted. If there is no indication at all from the lamp, the capacitor is open.

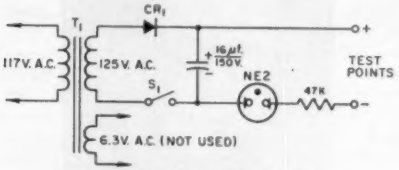


Fig. 3—Simple capacitor checker.

CR_1—50-ma. semiconductor diode.
S_1—S.p.s.t. switch.
T_1—Power transformer, 125 volts, 15 ma.; 6.3 volts, 0.6 amps. (Stancor PS-8415).

With electrolytic capacitors, the lamp will glow brightly at first and then, as the capacitor charges, will grow dimmer until finally the lamp will go out. If the indicator flashes more than once per second, the electrolytic is too leaky. Flashes at the rate of about one per second or longer are normal. Be sure to observe polarity when checking electrolytic capacitors. Caution: do not use this checker to test capacitors rated at less than 150 volts working. The isolation transformer T_1 may be left out of the circuit, but care should be taken when checking capacitors connected to other equipment that may be grounded or connected indirectly to power lines.

— *Paul Mezzapelle, jr., WV6NLJ*

SHIM-STOCK HOLE CUTTER

IN the course of constructing v.h.f. and other amateur equipment, I have always had difficulty in drilling holes in thin copper ribbon or braid used for grid and plate leads. It is practically impossible to use a conventional drill and it is difficult to grind a special tip for the job. I recently solved the problem by purchasing a 49-cent hand punch, such as those used by conductors to punch railroad tickets. This tool makes a nice, clean hole even in the thinnest stock.

— *Edward C. Schaefer, W8SQU*

CRYSTAL SOCKETS

MOST amateurs are familiar with the idea of using octal tube sockets as holders for .094 inch crystals, such as the popular FT243 series, but some may be interested to learn that the new .050-inch thin pin crystals can be mounted in Loktal tube sockets.

— *Arnold Reinhold, K2PNK*

EMERGENCY SOLDER

BEFORE setting out on Field Day or a long trip in the mobile station, prepare a few pieces of emergency solder. Melt some solder on a soldering iron and then flick the iron to throw the solder off. Catch the melted solder on a flat surface, such as a sheet of aluminum, and then peel it off. The resulting solder is extremely thin and will easily flow under the flame of a match. To solder a joint in an emergency where no iron is available, apply flux, wrap the thin solder around the joint and then heat with a match or lighter. The result is a good electrical connection made without benefit of a soldering iron.

— *Bill Phillips, K8EJL*

MODULATION MONITOR

THE circuit shown in Fig. 4 is an inexpensive modulation-percentage indicator consisting of four neon bulbs and eight resistors. The monitor is wired across the modulation transformer (or choke) secondary. When the modulation percentage reaches the predetermined value, the neon indicator will flash. Of course, the neon bulbs and associated circuitry should be well insulated against the high voltages encountered. When the B-plus voltage is higher than 500, it is a good idea to place several resistors in series for R_1, R_3, R_5 and R_7, in order to decrease the chance of arc-over.

— *Neil Iverson, W7PVF*

B+ Voltage	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8
250	270K	open	270K	270K	560K	270K	820K	270K
400	390K	820K	560K	270K	1 meg	270K	1.4 meg	270K
500	470K	510K	760K	270K	1.3 meg	270K	1.8 meg	270K
600	560K	430K	1 meg	270K	1.6 meg	270K	2.2 meg	270K
750	760K	390K	1.3 meg	270K	2 meg	270K	2.8 meg	270K
1000	1 meg	350K	1.8 meg	270K	2.8 meg	270K	3.9 meg	270K

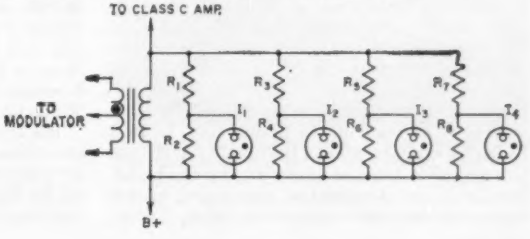


Fig. 4—Modulation-percentage indicator. Resistors are ½ watt. I_1 indicates 25 per cent, I_2 50 per cent, I_3 75 per cent and I_4 100 per cent modulation.

I_{1-4}—NE-2 neon lamps.

Happenings of the Month

FCC DENIES RENEWAL OF LICENSE . . .

In an action stretching over more than five years, FCC has denied renewal of the amateur station and amateur operator licenses of Alfred Newell Johnson, W6AQY, of Berkeley, California. The Commission had asked certain questions of Johnson in connection with the renewal of his commercial licenses, and, failing to get answers, early in 1955 had denied renewal of the commercial tickets. In 1958, the questions arose again in connection with Johnson's application for renewal of his amateur station and operator licenses. Once more failing to get answers, the FCC then ordered a hearing to determine whether Johnson had failed to answer lawful questions with respect to his qualifications to be a licensee, and whether, in the light of the evidence, his commercial and amateur licenses should be renewed. In 1959 the hearing was held, and in 1960 the Commission issued a final decision, denying renewal of all the licenses. (*Sections 303 (l) and 308 (b), Communications Act, 1934, as amended.*)

. . . AND SUSPENDS THREE OTHERS

The General Class licenses of Leon M. Blahnik, K9THI, and Larry Thomas Klibowitz, W9LHR, both of Milwaukee, Wisconsin, were both suspended for the remainder of the license terms (to May 9, 1965 and October 19, 1964, respectively), for taking part in a fraudulent examination. The FCC charged that Klibowitz had actually taken the General Class examination in Blahnik's name at the Commission's Chicago office on April 8, 1960. The suspensions, not contested by either man, became effective July 24, 1960. (*Section 303 (m) 1 (F) of the Act and section 0.292 (f) and 12.162 of FCC regulations.*)

In a separate action, the General Class license of William L. Bradford, jr., K6YDQ, of Los Angeles, was suspended for three months for transmitting false and deceptive signals on 159.09 Mc. Bradford requested a hearing, but later withdrew the request, and the FCC ordered the suspension into effect on October 27, 1960. (*Section 325 (a), of the act and Sections 12.23 (c), 12.28, 12.111 and 12.113 of the FCC regulations.*)

STAFF NOTES

With the retirement of W1BUD (January *QST*, page 11), John Huntoon, W1LVQ, on January 1 became Secretary and General Manager of ARRL, Secretary of the IARU, and Editor of *QST*.

An amateur for nearly thirty years, "JH" is a veteran of 22 years on the League staff. In 1923 he built a crystal set (with the usual Quaker Oats box and slide tuner arrangement) for the broadcast band, but then interest lapsed until he was exposed to ham radio as a Glen Ellyn, Illinois,



John Huntoon, W1LVQ
Secretary & General Manager, ARRL

high school student; he promptly converted the school science club into a radio club and soon was active as W9KJY, with particular attention to League field organization and traffic nets. He became RM, Corps Area NCS for the old Army Amateur Radio System, and was elected Illinois SCM in 1936. "JH" also served several terms as Secretary of the Chicago Area Radio Club Council and was a key figure in the management of the 1936 Central Division and 1938 National Conventions in the Windy City, taking time out during the latter to cop the code speed trophy.

It was his outstanding organizational job in connection with the 1938 National Convention which made him a marked man for League Hq. material; he joined the ARRL staff in 1939 as assistant secretary. Besides routine duties, he wrote the basic material for our *Learning the Radiotelegraph Code* and, when Ed Handy went into wartime service, acted also as communications manager, having responsibility for the development of regulations governing the War Emergency Radio Service of amateur civil-defense communication. With a decimated staff during early wartime, extra duties were many, and we believe he is the only *QST* author to have three separate by-lined articles in a single issue. In 1942, he took a leave of absence from League duties to become Chief Radioman, USCG, first as an instructor at radio school and later in communications intelligence work. Postwar he returned to the League, becoming assistant general manager in 1956. John was initiated into international conference work by W1BUD at Atlantic City in 1947, and with him was a member of the U.S. delegations to the 1949 Fourth Inter-American Radio Conference in Washington, D.C., and the Geneva Radio Conference in 1959.

His travels for the League have taken him to 48 of the 50 United States, representing ARRL at conventions and affiliated club visits. Feeling, as did his predecessor, that the position of Secretary requires an appreciable amount of member-

ship-contact travel, he plans to continue. So perhaps you'll be seeing him in person soon.

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Byron Goodman, now licensed as W1DX and formerly holder of W6QV, W6CAL and W1JPE, was congratulated by fellow members of the ARRL Ten-Year Club in December, upon completion of 25 years of service to the League as a staff member. A native of San Francisco, where he was first licensed in 1930, By graduated as an electrical engineer from the University of California. By was one of the real pioneers on the ten-meter band; W6CAL enjoyed the first confirmed North America to Asia QSO, working J2HJ early in 1935. He came to headquarters in 1935 as an assistant secretary. In 1936, as a sideline, he originated the "How's DX?" column of *QST*, and was its conductor until 1947. In 1939 By moved down the hall to become an assistant technical editor of *QST*. In this capacity he is especially well-known for his many articles on keying, modulation, single sideband, and receivers. His other column, "On the Air With Single Sideband," recorded the growing pains of a new mode from 1948 until it was well established in 1953. While on leave of absence during World War II, By helped design radar receivers at Raytheon in Waltham, Mass. His by-line (sic!) appears less frequently in *QST* these days, for he now has primary responsibility for the annual revision of the *Radio Amateur's Handbook*.

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Mason Southworth, W1VLH, whose 7-year career at ARRL has been among our most varied, left the staff in December to join *Control Engineering*, a McGraw-Hill magazine. Starting out as a part-time lab assistant while a sophomore at Hartford's Trinity College, Mason soon became well-known to *QST* readers for his neat v.h.f. gear. In 1956, Mason organized the ARRL-IGY project, which he directed for nearly three years. After a year at Stanford University as a research assistant and graduate student, Mason returned to *QST* in June, 1960 as an assistant technical editor. We'll miss his quiet efficiency here, but we wish him well for the future.

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A new addition to our staff, as an assistant secretary, is Raymond T. Higgs, W6OGI, of Los Angeles (joining, in that post, another Californian, K6SNA/K1LVW). Ray has been licensed since 1952, and likes 6-meter phone and 40-meter c.w. in particular. He holds a B. A. in Education and Social Science from Humboldt State College (Arcata, California), and served as a sergeant in the Army Security Agency during and after the Korean emergency. He's been secretary-treasurer of the Echo Park Radio Club, and a member of both the Two Meter and Down Club and the Glendale Zero Beaters Radio Club. Ray, a 30-w.p.m. op, has also served as code instructor in classes conducted by the Belmont High School Radio Club, and the Humboldt College club. QST

25 Years Ago this month

March 1936

. . . The editorial discussed the inability of some hams to carry on sparkling conversations on the air.

. . . George Grammer had more dope on how to get the most out of noise-silencing circuits.

. . . W9UZ (who is now known on sideband as W4CF) had some interesting dope on "fists" he had seen, using an ink recorder of his own manufacture.

. . . The ubiquitous Mr. Grammer surveyed practical circuit arrangements for transmitter band-switching systems.

. . . Keith Williams, W6DTY, was in the issue with one of his excellent efforts — this one fiction(?) based on the DX contest.

. . . Besides the usual hints and kinks there were technical articles on transmission-line loading for short antennas, the application and treatment of crackle enamel, pentodes as Class AB amplifiers, an improved speech preamp, and high voltage from 32 volts d.c.

. . . From the operating standpoint, this issue of 25 years ago carried the results of the 3.5-Mc. transoceanic tests, a reminder of the 8th International DX Competition, the results of the 3rd VE-W contest, and about a page of DX notes.

. . . The fellow who now (in 1961) holds the call W1DX loves to needle the Managing Editor about some of the coincidence strays that are printed. But let us quote from page 70 of *QST* 25 years ago. "Another coincidence: W6CAL, moving to the East Coast, was assigned the call W1JPE. His first W contact, made on a 'CQ SF,' was with a San Francisco station, W6JPE!"

Strays

WA2IMG and W2JKI now claim the record for the longest QSO. Last July they maintained contact over a 65½-hour period, during which time some 60 other stations checked in and out. This madness took place on 2-meter phone.

—···—



Because K5VGY couldn't seem to tear himself away from his ham rig and get his lawn mowed, some of his friends (K5LEZ and K5LWG) went to some lengths to rig up a radio-equipped mower. As you can see, this thing is obviously not self-propelled!

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

DESPITE the average amateur's proclivity to resist changes in the status quo, amateur radio progresses. A good case in point is the use of single-sideband techniques. The past few years have seen a tremendous increase in the use of s.s.b. on lower frequencies. The v.h.f. fraternity has, however, remained somewhat cold to this method of communication. Prime objections have been that the equipment required is relatively complex and the erroneous belief that the prime advantage is spectrum saving (and who needs to save spectrum on the v.h.f.?).

Now in truth there are some good things to be said for sideband techniques. However, one must not be misled into thinking that sideband techniques mean anything less than a complete revolution in your receiving and transmitting departments. Most knowledgeable proponents of sideband have long pointed out that the prime advantages of the techniques are in the receiving system. It is true, for instance, that all a.m. phone stations transmit not just a single sideband, but two sidebands and a carrier. It is obvious that the single-sideband station is deficient by one carrier or one sideband. Now if the sideband transmitter has been properly designed, it will be sending out on one sideband all of the information contained in both sidebands of the a.m. station, and in addition it will be sending the single sideband with at least twice the amplitude of either of the sidebands of the a.m. rig. The pilot signal emitted by the a.m. transmitter (sometimes termed by the sidebanders as the whistle) is conveying little or no intelligence and can obviously be eliminated at considerable saving in power. (Note! The carrier may be considered to be conveying information when during QRM conditions its disappearance signifies the fact that the transmitting station has stood by.)

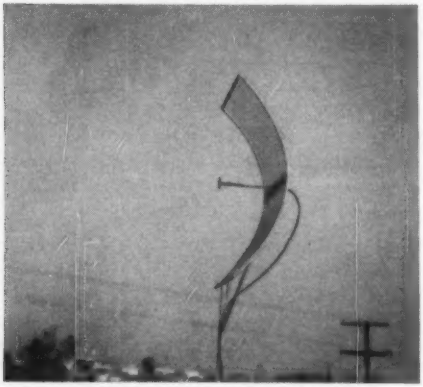
The important fact is that the sideband station has, in a space of 2+ kc., managed to transmit all the useful intelligence required. The double-sideband a.m. station must, of course, use twice the bandwidth to convey the same information. Now it is easy to say "who needs the extra space" and it's just as easy to answer that your receiver does. It is obvious to the initiate that a receiver with a bandwidth of 5 kc. has a 3 db. poorer signal-to-noise ratio than a receiver with a bandwidth of 2.5 kc. If the same information can be received in the 2½ kc. bandwidth, then an improvement in receiver signal-to-noise ratio of 3 db. can be obtained.

This same improvement can be obtained in the receiver whether or not the transmitter is sending one sideband or two. However, it is obvious that if the transmitting station is sending two sidebands and you are receiving only one of them, you will have lost 3 db. worth of signal by eliminating one of the two available sidebands. The net gain in your communication circuit will be zero unless the transmitting station puts all of its information into one 2½ kc. spectrum. Under these circumstances you will have gained 3 db. in signal-to-noise ratio. At the same time, because of the elimination of the carrier, the transmitter input power will have been reduced to approximately ⅓ its previous input. So a transmitter which was running 100 watts input and was 100 per cent amplitude modulated would now be able to run approximately ⅓ as much input and, if the receiver is operated with a 2½ kc. passband, produce a 3 db. better signal-to-noise ratio.

There are many other benefits to be obtained from sideband. For instance, the operation of your final amplifier in a linear condition tends to decrease the amount of spurious signals generated. The generation of a sideband signal requires the use of heterodyne techniques to increase frequency and as a result frequency instabilities are transferred rather than multiplied. The type of receiver required for adequate sideband reception is of necessity considerably superior in both resetability and selectivity than the average receiver.

We have on numerous occasions heard claim to the effect that sideband was equal to c.w. in the transmission of information under weak signal conditions. How much truth is contained in this statement is entirely dependent upon the particular conditions under which the task is performed. If, for instance, receiver bandwidth is

* P. O. Box 334, Medfield, Mass.



1215-Mc. Parabola in use at WA6GHW.

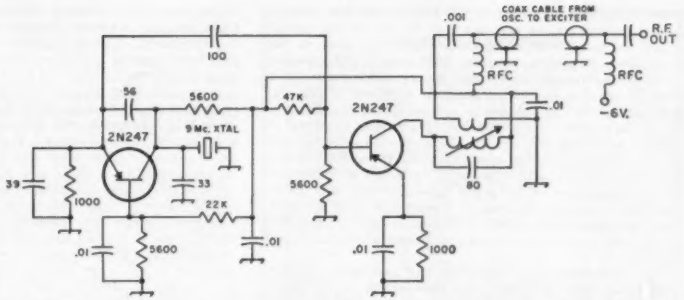


Fig. 1—Primary frequency control, 1296-Mc. moon-bounce project.

held constant, then the sideband transmission is capable of transmitting more information in less time than the c.w. transmissions. However, the single-sideband transmission requires a receiver bandwidth of at least 2 kc., whereas the information contained in the c.w. signal can be easily accommodated in a 200-cycle bandwidth.

Now, sharpening the receiver from 2 kc. to 200 cycles will give an improvement in signal-to-noise on the c.w. signal of ten decibels. Thus a sideband signal which is even with the noise is, in fact, 10 db. weaker than the equivalent c.w. signal could be if advantage was taken of the narrower permissible bandwidths. Now obviously the c.w signal can be copied through a considerably narrower passband than 200 cycles and in fact bandwidths on the order of 20 to 30 cycles could be employed giving an additional improvement of 10 db. Of course, this 20 db. superiority of the c.w. over sideband is not all gravy. Considerably more stability is required on both the receiver and transmitter in order to employ the narrower bandwidths, and furthermore some mechanical or electronic aid to the ear will be required in order to copy the c.w. in narrower bandwidths. The fact remains, however, that c.w. is anywhere from 10 to 20 db. or more superior to sideband under ideal conditions for both. The point in argument is that preparing your equipment for sideband use on the v.h.f. is the first step in preparing it for narrow bandwidth c.w.

Not all of the benefits of sideband are in the equipment. The more businesslike and practical operating techniques employed by sideband operators are conducive to better QSOs. The practice of operating the same frequency and using voice-controlled transmission is conducive to inviting others into the QSO. Furthermore, when you hear a sidebander calling CQ, you know that he is listening on the frequency he is calling on.

One of the prime requirements of v.h.f. sideband is to have a stable primary frequency source. The circuit shown in Fig. 1 (designed by HB9MS) is the one employed at the Rhododendron Swamp VHF Society to provide the primary frequency control for our 1296-Mc. sideband transmitter. Obviously, this is only one of many methods of obtaining a stable frequency source. However, it was designed with reliability and stability as a primary concern, and in its eight months of operation it has indeed proved both reliable and stable. (Incidentally, we are still operating with the same 6-volt battery.) The output frequency of this control is 9 Mc. and in our case it is driving a 6AK5 Class A amplifier which in turn drives a string of three more tubes coming out on 36-Mc. This may seem like quite a complicated arrangement to provide stable frequency control and, in fact, it is. There is, however, a certain amount of satisfaction gained from the knowledge that your transmitter is on the exact frequency that you think it is. The choice of crystal frequency should be dictated by the available s.s.b. generator. Naturally, the same frequency control is used for both the transmitter and the receiver.

50 Mc.

Most information concerning the Canadian Northwest Territory which is printed in this column is received from Pete Radcliffe, VE8BY; and thanks to his faithful reporting we do get a glimpse of things happening in VE8 land. Pete has very few contacts so it's to the advantage of all of us if we turn the beams in his direction more frequently than "occasionally", as every one of his contacts is a skip or DX contact.

At the present time the rig in VE8 land consists of a 6AG7, 5763, 4–65A running 150 watts plate modulated. On December 16 at 0525 GMT, K2KCI was heard calling CQ and after Pete finally got him to turn his beam to the northwest, reports were exchanged. K2KCI receiving 5–7–9, VE8BY receiving 4–3–9. December 22 was one of the better days for Pete when Winnipeg, Manitoba, came through with phone signals as high as 40 over 89. Stations worked on that day were VE4CV, VE4FY, VE4TL, and VE4RE, all on phone.

Word received from another of our Canadian friends leads us to hope that we'll have continued 50-Mc. work in VE7 land. VE7ALV writes that he is trying to get a rig on the air before the end of February. Dennis is building his receiver but because of the current shortages in time, schematics, money, etc., is not too sure he'll be on when he hopes to be. At present he is using a regen job on six, and agrees with all of us that it is much too noisy for 50-Mc. work. Sez he hears buckets of signals on six but cannot read 'em because of the regen hiss. Dennis is living at Bull Harbor, B.C., situated at 50.55 North, 127.57 West, Hope Island, 4 miles off Vancouver Island in the northeastern part of the Pacific. Closest six-meter men are in Vancouver, B.C., which is three hundred miles to the southeast, (in the tropics, eh, Dennis!), closest civilization is thirty miles, and all transportation is by aircraft with supplies and mail brought in once a week by boat.

If we all heard the same skip and aurora signals as Geoff, VE2AIO, I'm sure that once again 50 Mc. would be booming from dawn 'til dusk. On Dec. 1, 1320Z, VE8BY was heard briefly after eastern U. S. A. aurora signals went out. Dec. 5, 1320Z, WØPME, Jefferson City, Mo., worked for a new state for Geoff, also the first E_s opening of the winter in VE2 land. Dec. 6, 0000Z, 0148Z, E_s opening to southwestern Ohio, Kentucky, Minnesota. All contacts were made on s.s.b. in VE2-land. Dec. 7, 0038Z. Short opening into Florida

when W4RMU was worked. At 0101Z, heard a Spanish speaking phone station calling CQ at 50.193 but was unable to get the call due to rapid QSB. Beam due south at the time. Dec. 8, aurora between 0030 and 0115Z, worked K3AXW in Delaware for another new state. December 10, a weak E_s opening to Florida between 1600 and 1700Z, signals very spotty and apparently in local QSOs. The E_s opening of December 18 was the best yet in the Province of Quebec, according to Geoff. He got on the air at 2020Z and the last signal was heard around 2230Z. Three W6/K6 stations were heard but he was unable to record them because of low modulation or too rapid signing of the calls. Other than the west coast stations, the opening favored W4-land. Final opening for the month of December and for Geoff was on Dec. 29, a short auroral opening during which he worked VE3CJN.

The old familiar call of W7WLV will once again be heard emanating from Nevada. Jay Farnsworth, ex-W7WLV, ex-K6BNR, once again W7WLV, is back on 50 Mc. from Empire, Nevada.

220- and 420-Mc. STANDINGS

220 MC

W1JR	11	4	480
W1AZK	9	3	412
W1HDQ	11	5	450
W1OOP	12	5	400
W1RFU	15	5	480
W1UHE	11	4	385
W2AOC	13	5	450
K2AXQ	8	3	230
K2CBA	10	4	325
K2DIC	4	3	140
W2DWJ	15	6	740
W2DZA	12	5	410
K2KIB	12	4	300
W2LRJ	10	4	250
W2NTY	12	5	300
K2PPZ	11	4	190
W2LWI	11	4	400
K2QJQ	13	5	540
W2SEU	4	2	150
W3AHQ	4	3	180
W3FEY	10	4	296
W3JYL	8	4	180
W3JZI	4	3	250
W3KKN	10	4	255
W3LCC	8	5	300
W3LZD	15	5	425
W3RUE	9	5	450
W3UJG	13	5	400
W3ZRF	5	4	112
K4TFU	8	4	400
W4UYB	7	5	320
W4UMF	11	5	420
W5AJG	3	2	1050
W5RCI	8	5	700
W6NLZ	3	2	2540
K6GTG	2	1	240
W6MMU	2	2	225
K7ICW	1	1	250
K8AXU	10	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8NRM	8	4	390
W8PT	10	5	660
W8SVI	6	4	520
W9AAG	9	4	600
W9EQC	11	5	740
W9JCS	5	2	340
W9JFP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
KØDGU	5	3	425
KØITF	6	3	515
KH6UK	1	1	2540
VE3AIB	7	4	450

420 MC

W1HDQ	8	3	210
W1MFT	8	3	170
W1RFU	7	4	410
W1OOP	10	3	390
W1AJR	8	3	230
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
W2DWJ	10	4	196
K2CBA	5	3	225
W2DZA	5	3	130
W2NTY	3	2	100
W2OTA	9	3	200
K2UUR	7	3	175
K2KIB	4	2	100
K3EOF	6	3	250
W3FEY	7	2	225
W3RUE	2	2	96
W4HHK	5	4	550
W4VVE	6	4	410
W5HTZ	3	2	400
W6GTG	1	1	180
W5RCI	9	3	600
W7LHL	2	1	180
W8HCC	3	2	355
W8HRC	3	2	250
W8JLQ	4	2	275
W8NRM	3	2	390
W8RQI	4	2	270
W8PT	4	3	310
W8TTY	7	4	580
W9GAB	9	4	608
W9AAG	5	3	375

Duncanville, Texas, and Ray Clark, K5ZMS, sends a report of band openings he's heard beginning with Oct. 8. Other openings were heard or worked on Nov. 15, Nov. 25, Dec. 1, Dec. 2, Dec. 6, Dec. 18, Dec. 21, Jan. 2, Jan. 3, Jan. 7, 8, 9. Might compare these with your own log and see what you were hearing on those days; your old logs frequently make very interesting reading on a dull day. Ray uses a Communicator III and a 5-element beam up about 300 feet. He also makes the popular request that youse guys tune above 50.2, although he admits that more of the gang are doing it right along.

Reports coming from about a dozen states indicate openings on December 1, 2, 4, 5, 6, 7, 18, 20, 22, 23, 26; auroral openings on December 7 and 15. W6IEY reports hearing 5's on December 1 and also XE10E working 6's in the L. A. area. Dick heard the 5s again on December 4 and 6, the latter date he also worked into Utah. Best opening in a long time, he says, was the December 6 one during which he heard six states and a wide area of northern California. K6SIX reports the December 2 opening also into 5-land and Mexico City, and an opening into Colorado on Dec. 7. New Jersey had openings on the 5th and 18th of December according to Ken, WA2BDP; into Missouri on the 5th and on the 18th into Ohio, Illinois, Nebraska, Wisconsin, Missouri, Texas, Louisiana, Alabama, Kentucky, Tennessee, Kansas, Oklahoma and Arkansas. Thirteen states during one evening is pretty good listening. K1PNI, Tony, mentions the "terrific band opening" on December 5 when he heard all call areas except the 7's. He tried hard but sez his little 15 watts just couldn't quite make it. K1CXX in Maine also heard an opening that night but he heard only Michigan and Indiana; while W1EXZ worked into Indiana, Ohio, Illinois, Kentucky and Tennessee from Vermont. W1EXZ also worked VE1WL on December 6, first time he's heard the VE1's. K9RRS worked K2EFA, W2SRO and W2MEA, all s.s.b., on the opening of the 5th. Michigan also came through with news of the opening on the 6th when W8NOH started hearing east coast stations; the band then changed to Montana and North Dakota. During that period Lou also heard VE8BY on 50.070 Mc., c.w. He was in for about 20 minutes in Michigan. One of the better pieces of news from W8NOH is that on January 2, 1961 he worked KL7DEF and KL7CED. We're all very happy to know that the KL7 activity is continuing on 50 Mc. Short but sweet from Reno, Nevada, and W7MAH: "Six meters open to W4, 5, 6, 7, 0 on 6th of December. Open W5, 7 on the 18th. W5, W7 and WØ on 22nd. Texas in on 23rd." With at least two active 50 Mc. stations (W7MAH, W7WLV) operating regularly, there's bound to be high activity. KØLCB observes that the December 18 opening was one of the best December openings in the past two years. Band was open to New Jersey, New York, Mass., Conn., North Carolina, Maryland, Pennsylvania, Delaware, Ohio, Ind., Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. Does sound like a good day in Missouri. Band was also open for Dave on New Year's Day to New York, Mass., Conn., Pennsylvania. The opening on December 6 brought state number 44 to Dave, K8BGZ, when he worked WØGN8 in North Dakota. Band was also open for him to the east, swinging around through the south, then into Colorado, Montana and Wyoming on that date. On the 18th of December Dave worked KP4AIS at 2125 GMT at which time the band was also open for him to Florida. Dot Hall, KØGIC, caught the opening of the 18th in Kansas when the band was open for her to Florida and Alabama for about 30 minutes. She also caught a 15-minute opening to Texas on December 20. In Pennsylvania, Jule, W3RTV, heard the following states during the opening of January 2: Louisiana, Alabama, Mississippi. The skip stations were working stations in eastern and western Pennsylvania and eastern Ohio.

Reports on aurora came in from three stations, W1EXZ, K1CXX and W8NOH. Bob, W1EXZ, reports good aurora on December 7 as far south as Wilmington, Delaware and K3AXW. K1CXX, Dick, sez there were fair auroras on December 7 and 15, when he worked W1, W2 and W3 stations. Phone signals very rough copy for Dick on those nights. Lou, W8NOH, worked KØNOL, North Dakota, and WØLKJ during the December 15 aurora.

Clubs and Nets

On January 11 a group of v.h.f. men met in Long Beach, California, and from this meeting came forth the Microwave Society of Long Beach. Twenty charter members enrolled and four more members have joined the roll since the original meeting. The group will meet every second Wednesday of the month at the Bayshore Public Library, 2nd Street and Bayshore Ave., Long Beach, at 8:00 P.M. Plans have been made to have experienced radio amateurs in the v.h.f. and microwave field lecture on subjects of interest. Club building projects are also on the agenda.

The Kansas City VHF Club has 113 members as of the first of the year.

A new six-meter net for the area north of Lake Pontchartrain, Louisiana, met initially on January 1 at 2000 on 50.4 Mc. Stations checking in were W5UQR, K5RFC, W5EWW and K5MHH, and W5IVI. This net will meet each Sunday night at 2000 on 50.4 Mc. At present a static membership at 15 stations is seen.

144 Mc.

Final reports on the Geminids meteor shower would seem to indicate that this was probably one of the best meteor showers of the year. John, WØBFB, picked up two new states and gave a new state to both of them when he worked Jess, W4AIB and Allen, W4RMU for states number 36 and 37. Incidentally, this brings Allen up to 21 states from Florida and Jess up to 25 states from South Carolina. Pretty good DXing when you're hemmed in by an ocean on two sides.

Tom, WØIUF, whose Geminids exploits were recounted last month, is looking forward to some m.s. schedules during the coming summer showers. Anyone interested in setting up schedules should write as soon as possible, be sure to include frequency and a rundown on your equipment. Tom is running 250 watts to a 4X150 and has an 8-element long john up 500 feet. Primary operating frequency is 144.200. Tom is attempting to father a 40-meter scheduling frequency. He would like to see a nightly get-together on 7210 kc. sideband for the purpose of disseminating information. If no openings were imminent it would serve as a good time to exchange ideas on equipment, techniques, etc. Such skeds set up at about 0000 GMT daily might help advance the art and certainly would prove interesting. What say? I would certainly go along with this type of schedule although I believe the time is a little on the early side. In any event, we'll be looking on 7210 for any interested parties. If you don't find *me* there, look on 3805. Speaking of meteor showers, we received a letter from Don, WA6MLX (144.120) in which he outlined the results of his meteor-scatter schedules with any number of people, such as W5FYZ, K5TQP, WØENC, K7IDD, etc. So far his results have been a few pings, a few call letters and just enough information to tease him along and keep up his interest. Interesting, to me, part of the letter started on page 2 with the information on his new 1-Mc. precision crystal oscillator. This device is transistorized with a varicap frequency control, sealed in a thermos liner ready to bury at his new QTH. Output goes through a multiplier chain to 24 Mc. and into his rig. Don figures short-term stability should be good to a few parts in 10 to the 10th. He is also constructing a 30-cycle audio filter at 1 kc. using toroid coils. Sounds like he's really getting ready for some weak-signal work and looks like he's a good shot for some information on high-stability oscillators. Anyone interested I suggest you drop Don a line at 444 North Florence, Burbank, California. Also received a card from Jose, CT3AE. Very short card, I quote "I am very interested in 144-Mc. work. Is it possible to QSO from Madeira to U. S. A.?" Anybody interested? It's hard to believe that I did receive a note from Harold, K7HKD, stating that there are six stations active in the Cheyenne area on 144 Mc. And to make matters worse, Harold tells me that he and W7YJG are converting a pair of APX6's for 1215 Mc. Looks like the wild West is going v.h.f.

220 Mc. and Up.

Bob, K2GGA, North Syracuse, New York, is looking for schedules on 220 and 432 Mc. with anyone, preferably in the easterly direction. As a matter of fact, he sent me a whole letter full of questions but he forgot to mention what frequency he operates on. If you're interested I'd suggest dropping him a line outlining what you think is good equipment and what frequency you operate on. He would like to see a listing of the 432 Mc. stations with frequencies. So would I, but they are hard to come by unless you send them in. Old Dick, K4DU, spent the month of December in the hospital and is recuperating by working all over the state of Florida on 220 Mc. Dick also operates 144 and 50 Mc., but his primary interest is in 220. He's still looking for schedules from any interested parties. Glen, WA6GHW, leaves no doubt in anyone's mind as to the activity on 1296 in the California end of the country. The last contest netted 12 contacts in 2 sections on 1215 Mc. Glen reports W6PUZ, W6LDF, W6VZI, WA6EWV, WA6NIH, W6PCQ, WA6HJV, WA6HIT, W6UID, W6MMU and W6NLZ, all active on 1215 with APX6s. Incidentally a picture of Glen's parabolic antenna is shown on page 56. K3AKR reports his APX6 modifications well under way and K3CXC reports equipment in operation for 3300 and 10,000 Mc. with ERPs of 300 and 1000 watts respectively; he is looking for week-end skeds with any interested parties. Many requests have been received for information on where to obtain APX6s. Because the surplus market is constantly changing, the best bet is to keep an eagle eye on the various surplus ads in some of the magazines and the surplus bulletins that are published.

OES Notes

W4CIN — 100 watts s.s.b. on 50 Mc.

K1JML — Finished constructing new 50-Mc. converter, schematics available, drop him a card.

W3RTV — Caught 6-meter band opening on January 2.

KØRWC — Getting Field Day equipment ready for next year.

2-METER STANDINGS

W1REZ	32	8	1300	W6WSQ	15	5	1390
W1AZK	28	8	1205	W6NLZ	12	5	2540
W1KCS	24	7	1150	W6DNG	9	5	1040
W1RFU	24	7	1120	W6AJF	6	3	800
W1AJR	23	7	1130	W6ZL	5	3	1400
W1MMN	21	7	1090	K6GTG	4	2	800
W1HDQ	22	6	1020	W6MMU	3	2	950
W1IZY	20	7	1180				
K1CRQ	19	6	800	W7JRG	13	4	1040
W1AFO	17	6	920	K7HKD	11	5	950
K1AFR	17	5	450	W7CJM	5	2	670
				W7LHL	4	2	1050
W2NLY	37	8	1390	W7JIP	4	2	900
W2CXY	37	8	1360	W7JU	4	2	253
W2ORI	37	8	1320				
K2GQI	33	8	1200	W8KAY	38	8	1020
W2AZL	29	8	1050	W8SDJ	37	8	1220
K2IEJ	27	8	1060	W8SPT	37	9	1260
W2BLV	30	8	1020	W8IFX	35	8	980
W2AMJ	25	6	960	W8LOF	33	8	1060
W2DWJ	23	6	860	W8SFG	34	8	1040
K2HOD	23	7	950	W8RMH	32	6	910
W2PAU	23	6	753	W8GGH	32	8	1180
W2ALR	23	7	960	W8SVI	30	8	1080
W2RXG	23	8	1200	W8EHW	30	8	860
W2SMX	23	7	1090	W8LPD	29	8	850
K2CEH	22	6	940	W8WRN	28	8	680
K2LMG	24	8	1160	W8BAX	32	8	960
W2LWI	21	6	700	K8AXU	29	8	1050
K2KIB	21	5	900	W8NOH	26	8	975
W2ESX	20	6	750	W8DX	26	8	720
W2WZR	19	7	1040	W8ILC	25	8	800
W2UTH	19	7	880	W8JWV	25	8	940
W2RGV	19	6	720	W8WNM	25	8	900
K2RLG	17	6	980	W8GFN	23	8	540
				W8LCY	22	7	680
W3RUE	33	8	1100	W8BJN	21	7	610
W3GKP	31	8	1180	W8GTK	17	7	550
W3SGA	31	8	1070	W8NRM	17	7	550
W3TDF	30	8	1125				
W3KCA	28	8	1110				
W3SGA	31	7	700	W9KLR	41	9	1160
W3EPH	22	8	1000	W9WOK	40	9	1170
W3BYF	28	8	1070	W9GAB	34	9	1075
W3LNA	21	7	720	W9AAG	33	8	1050
W3NKM	20	7	730	W9REM	31	8	850
W3LZD	20	7	650	W9ZIH	30	8	830
				K9AAJ	29	8	1070
W4HJQ	38	8	1150	W9LVC	27	8	950
W4HHK	37	9	1280	W9EQC	27	8	820
W4ZXI	34	8	950	W9PBP	27	8	820
W4LTU	34	8	1160	W9OJI	26	8	910
W4AO	30	8	1120	W9ZHL	25	8	700
W4MKJ	33	8	1149	W9BPV	25	7	1030
W4UMF	28	8	1110	K9AQF	24	7	900
W4VLA	26	8	1000	W8LF	22	7	825
W4AIB	25	8	1320	W9KPS	22	7	690
W4EQM	25	8	1040	W9CUX	21	7	800
W4WNH	24	8	850	W9PMN	19	6	800
K4EUS	24	6	765	W9ALU	18	7	800
W4JCJ	23	6	725	WØBFB	37	9	1350
W4RMU	21	7	1080	WØSMJ	29	9	1075
W4VVE	21	6	720	WØIHD	31	8	1030
W4TLV	20	7	1000	WØLFE	28	7	1050
W4IKZ	20	6	720	WØQDH	27	9	1300
W4OLK	20	6	720	WØRUF	23	7	900
W4CPZ	18	6	650	WØINI	21	6	830
W4RFR	18	7	820	WØTGC	21	7	870
W4MDA	17	6	750	WØRYG	20	8	925
K4YUX	18	8	630	WØIC	19	7	1245
W4LNG	18	7	1080	WØMDX	19	6	1150
				WØJAS	18	6	1130
W5RCI	35	9	1215	WØAZT	17	6	1100
W5AJG	30	9	1360	KØAQJ	16	6	1120
W5DFU	28	9	1300	WØIFS	16	6	1100
W5LPG	25	7	1000				
W5PZ	27	8	1300				
W5FYZ	26	9	1160	VE3DIR	30	8	1330
W5KTD	23	8	1200	VE3AIB	28	8	1340
W5JWL	29	7	1150	VE3PQN	19	7	790
W5ML	16	5	700	VE3DER	17	8	1340
W5PSC	12	5	1390	VE3AQG	18	8	1300
W5HEZ	12	5	1250	VE3HW	15	7	1350
W5CVW	11	5	1180	VE2AOK	13	5	550
W5NDE	11	5	625	VE3BPB	14	6	715
W5VY	10	3	1200	VE2ABE	9	4	580
W5SWV	10	3	600	VE7FJ	2	1	365
W5UNH	6	3	1200				
W5YYO	4	3	1330	KH6UK	1	2	2540

KØLCB — Looking for 50-Mc. m.s. schedules on phone. Observed east skip openings to New England on first Thursday of 1961.

W4FWH — Working on 220 Mc. final using 4X150A. Contacted VE3DIR on meteor scatter on 144 Mc.

WØIUF — Made states number 8 and 9 on 144 with meteor scatter. December 13 made state number 10. Holding weekly skeds with WØENC on 50 Mc. Working on APX6 for 1215.

W6IEY — Completed 220-Mc. s.w.r. bridge. Nine-element 220 Mc. beam is completed but not up. Working on conversion of second APX6. Active on 50 Mc.

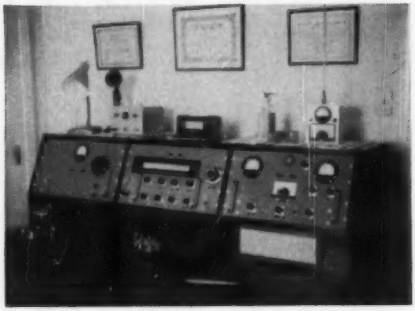
K1MVN — Active on "King Phillip Amateur Radio Society," Tuesday, 2000, 147.2 Mc.

(*Continued on page 140*)

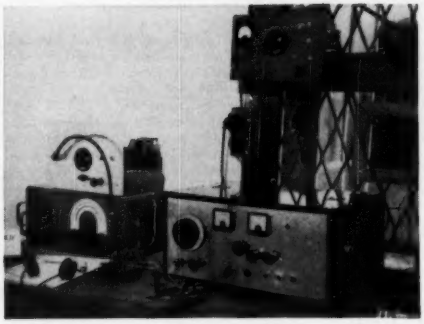
Home-Built Stations



This is KN3KPW, 13 years old, who worked along with his dad, W3KDR, to build this complete station. The transmitter is a 6AG7-6146 combination, the receiver a crystal-controlled converter feeding into a BC-454, and (at the right) a Little Oskey keying monitor. A 2-meter transceiver is perched atop the receiver. W3KDR, besides being a Washington attorney, is one of the eight vice-presidents of the South Lyme Beer, Chowder, and Propagation Society.



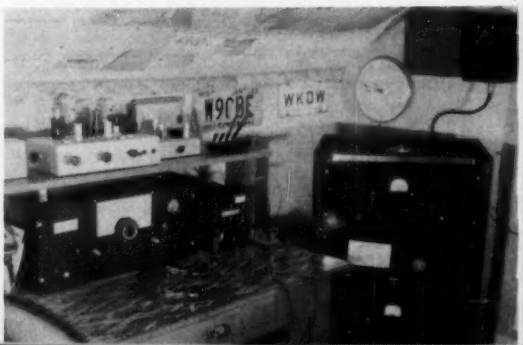
Here's a neat one! W5RKS used some surplus units in his triple-conversion receiver, but everything else is right from scratch. From left to right are his power supply, the receiver, and the 150-watt transmitter. He keeps the tube manufacturers happy by using 17 in the receiver and 18 in the transmitter. He also sent us some photos of the insides of the gear, and it's just as pretty behind the panel. His mobile rig is also a home-brew job.



As we've pointed out in previous issues, Ws aren't the only ones who build their own gear, and *may* be in the minority, percentagewise. Here is VQ3HD (ex-ZD6BX, ex-VS1BX, ex-etc.) from Tanganyika. At the right in the photo above is his transmitter, which is completely band switched 40 through 10 meters, running 90 watts input, c.w. only. The receiver is double-conversion, with the first r.f. oscillator crystal-controlled. The first i.f. is tuned from 2.0 to 2.5 Mc., giving uniform bandspread on each band.

Here's an interesting pair of home-built stations, both by the same fellow. At the left is W8TYE in Michigan in 1939, using a regenerative receiver and a 50-watt transmitter with a pair of 6L6s. At the right is the 1961 station of the same Hale Blakely, only now he is W9CBE in Wisconsin. Today's station uses a double-conversion superhet tuning 80 and 40, with crystal-controlled converters for 20, 15, and 10 meters. The transmitter has a completely rebuilt BC-457 as a v.f.o., with sequential keying, and an 812A final amplifier modulated with 807s in Class AB_2. Out of sight in the 1961 picture is his conelrad monitor and the many ARRL awards he has earned.





DX and Single Sideband

BY BILL LEONARD,* W2SKE

Increased use of the Lower Sideband is proposed to help solve increasing problems of working s.s.b. DX

I was a little too young to be on the air at the time of the Oklahoma Land Rush in 1893, but I was in full saddle on March 1, 1960, when the territory north of 14,300 was opened up to another group of adventurers. That 50 kc. had formerly been occupied entirely by roving bands of DLs, VEs, Gs and others, all geneologically related to the so-called DX tribe. Trading between these happy nomads and the far more numerous Ws was conducted at a high rate, but the border at 14,300 was almost inviolate. No W dared penetrate beyond it into DX territory upon penalty of action by Federal troops. DX men were free to wander at will in W land but when they did so they found they were suddenly very small frogs in a pond full of larger frogs and their voice was more often than not drowned out completely.

But, then, as I say, came March 1, 1960. At the appointed hour I swished my v.f.o. higher than it had ever been before and occupied a choice bit of real estate around 14,325.

Although I had hoped that my neighbor in this new land might be a UQ2, or at the very least HZ1AB, I found I was fighting it out with W2KR, down the street a couple of miles.

Since that day — leaving the Indians now, and getting down strictly to ham radio — the Ws *have* spread out and there *is* somewhat less phone QRM than previously on 20 meters. But the DX seems to have gone thataway!

A look at my log book confirms what I knew was happening. In the last 6 months of 1960 I worked about half as many DX stations on 20 sideband as in the corresponding six months in 1959. And if you think I'm complaining, take a listen and hear the others literally wailing. DX stations themselves find they can work Ws only when conditions are optimum — that is, when their signals rise right up to the level of the average W. They point out their handicap of less power, less gaudy antenna farms, and, more often than not, just give up trying to work Ws! What's more, they tell me, they've been having quite a time just trying to work each other. A lot of the W stations aren't happy, either. Gone are the days when a simple listen at the high end would tip off band conditions. Now it's spade work and digging to find out whether, indeed, that DXpedition to Mauretania is or is not calling CQ under a trampling herd of Ws on 14,300.

Now, if the truth be known and all the facts laid bare, we shouldn't really blame expansion of the W band for *all* our current DX problems. Conditions *have* changed. The whole world is no longer the 20-meter DXer's oyster, not 20 hours a day every day, anyway. Openings are shorter and signal strengths down as the sunspots retreat. They will get worse, much worse, before they get better.

The question is: how to get the most out of what we have. Various proposals have been put forth to give DXer a break. One plan — there are variations of it — is to channelize the ham bands. That may come in time, but it's a long way hence and will require FCC action not at present contemplated. A DX group has suggested reserving the five or ten kc. around 14,300 just for DXpeditions. This is not a bad idea, in principle. Certainly it would help us all *find* the DXpedition if you knew it was bound to be around that frequency. But what if two or more DX stations attracted the wolf pack at the same time. Imagine the clatter if they're working within a shade of each other.

As a practical matter s.s.b. DX stations working Ws in large numbers have lately been doing the worst thing possible, in my opinion — i.e., calling for stations to answer away from their own frequency. "Spread out!" you hear them cry. So we spread out. Perhaps now the DX station can make out a call a little sooner. But what had been 5 kc. of bedlam becomes 20 kc. of devastating QRM. In fairness to the rest of the band, DXpeditions who do not wish to be clobbered on their own frequency should call for answers on another *specific* frequency and reduce the number of calls by specifying the area they wish to work. E.g. "W2s only call 6 kc. below this frequency" . . . not "spread out, fellows."

But it seems to me that s.s.b. enthusiasts have overlooked one important tool in their struggle to work DX where there are fewer sunspots and no nearby special DX band.

Namely . . . the other sideband.

A trick many veteran s.s.b. operators know is that a quick switch to the other sideband is almost always more effective in clearing up QRM than trying to find an open frequency.

(*Continued on page 138*)



* c/o CBS, 485 Madison Ave., New York 22, N. Y.



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

ANNIVERSARY PARTY RESULTS

THE final results of the twenty-first Anniversary Party of the YLRL conducted Oct. 19 and 20 and Nov. 2 and 3, 1960, have been received from 1960 YLRL vice president Lillian Beebe, K3NLU. Lillian reports that 132 YLs gave c.w. contacts with 59 c.w. logs submitted. 367 YLs gave phone contacts, with 107 phone logs submitted.

This year the AP was scheduled earlier than usual, with a two-week separation between the c.w. and phone section. The usual 36-hour contest period was reduced to 30 hours, the c.w. section was held first, and ARRL sections were again used in scoring. With the usual good time enjoyed by all who participated, here are a few comments received from around the country:

W5HWK — The use of the ARRL sections as multipliers rather than just limiting the multipliers to the California sections is, in my opinion, a progressive step for APs. It is the only equitable method.

KØHEU — I think it is a good idea to have the party in the middle of the week — fewer OMs on the bands.

K2JYZ — It is especially nice to have the two weeks between contests.

K7HSB — It had been advised that the c.w. gals should listen carefully for phone gals who might attempt slow c.w. I work almost completely c.w., so the phone for me was quite a hassle. (That's a switch! — *Ed.*)

W8WUT — I didn't have a big score but I sure did have a lot of fun, with my biggest thrill working Fumi, JA1AEQ/JA6.

K8MZT — May I suggest that somehow we thank those DX gals who were so active in the contest?

Now for the winners. Recipient of the Corcoran award for the highest combined c.w. and phone score is Harriett Woehst, K5BJU. Mildred Wright, K5LIU/5, placed first in the c.w. contest. First place phone honors went to the President of the YLRL, Doris Anderson, K5BNQ. (Doris won the Corcoran award last year.) Gold cups have been awarded to K5LIU and K5BNQ. Second and third place c.w. winners were Joyce Polley, KØIKL, and Evelyn Ewing, K5TXQ, respectively. Second and third place phone winners were Barbara Houston, K5YIB, and Harriett Woehst, K5BJU. Certificates have been issued to these winners, and certificates were also issued to the top scorer in each U. S. district and to the top DX YL scorer.



With a total AP score of 17,220 points, Harriett Woehst, K5BJU, is this year's winner of the YLRL Corcoran award. Harriett used her HT-37 barefoot, running only 17–25 watts output on phone. S.s.b. operators will recognize K5BJU as editor of "The Sideband Sorority" in *The SideBander* each month. (*photo by W5VHR*)

TOP SCORERS

C.W.

First — K5LIU/5	4860
Second — KØIKL	4125
Third — K5TXQ	3601

PHONE

First — K5BNQ	14,300
Second — K5YIB	13,920
Third — K5BJU	13,735

Combined phone and c.w. winner

K5BJU 17,220

*YL Editor, *QST*: Please send all news notes to W1QON's home address: 318 Fisher St., Walpole, Mass.



SCORES

Only the station and the total score is given below. Complete score information, including number of contacts made, sections worked, and power multiplier, if used, will appear in *YLRL HARMONICS*. The scores are listed by state this year, as received from the YLRL vice president.

C.W.

Alabama	K4ZNK	25
Arizona	W7PUV	1,344
Alaska	KL7ALZ	925
California		
Los Angeles	K6QPG	2,380
" "	W6QGX	1,538
" "	K6OWQ	1,440
" "	WA6OWE	920
" "	WA6CCR	446
" "	K6OQD	400
" "	W6JZA	88
Sacramento	W6PCA	1,283
Santa Clara	K6VUE	805
Colorado	KØEVG	408
Connecticut	W1ICV	168
Washington, D.C.	W3TSC	163
Florida	K4RNS	1,704
Georgia	K4DNL	165
Hawaii	KH6DLD	513
Indiana	W9MLE	3,360
Kansas	KØGIC	2,700
Louisiana	K5TXQ	3,601
"	W4KZT/5	2,021
Maine	K1LCI	805
Massachusetts	K1EKO	79
Michigan	K8LHF	1,939
"	K8MKG	1,860
"	K8ONV	1,320
"	W8WQE	891
Minnesota	KØIKL	4,125
Nebraska	KØJFO	138
New Jersey		
Northern N.J.	K2UKQ	1,260
Southern N.J.	W4HWR/2	356
New York		
N.Y. City	K2JYZ	2,186
W. New York	W2RUF	306
Ohio	K8HKU	1,400
"	W8NAL	1,225
"	W8HWX	650
Oklahoma	K5BNQ	2,880
Oregon	K7ADI	124
"	W7DIF	31
Rhode Island	K1DWH	356
South Carolina	K4LSI	1,080
South Dakota	WØZWL	594
Texas		
South Texas	K5LIU/5	4,860
" "	K5BJU	3,485
North Texas	K5YIB	3,088
Virginia	K4TFL	560
Washington	K7HSB	1,125
West Virginia	K8MQB	1,080
Wisconsin	K9TUD	2,613
Canada		
British Columbia	VE7ADR	1,035
Alberta	VE6ABV	770
"	VE6YW	280
Saskatchewan	VE5DZ	768
Japan	JA1YL	31
"	JA1AEQ/0	1

PHONE

Alabama	K4ZNK	7,980
Alaska	KL7BJD	3,330
"	KL7ALZ	1,656
Arizona	W7OUE	4,410
Arkansas	K5JXD	8,613
California		
Los Angeles	W6QGX	10,620
" "	WA6AOE	6,750
" "	WA6CCR	5,625
" "	K6EXV	5,170
" "	W6WBH	4,515
" "	W6JZA	3,150
" "	K6OQD	2,025
San Diego	W6VSL	6,694
" "	WA6EVU	3,105
" "	K6UHI	968
Santa Barbara	K6KCI	11,210
Santa Clara Valley	K6VUE	1,645
San Joaquin Valley	K6YOA	450
Sacramento	K6RLR	8,456
Colorado	KØEVG	3,312
Connecticut	W1ICV	3,916
Florida (Eastern)	W4CWV/LKM	13,283
" "	K4RNS	8,480
Georgia	K4DNL	8,303
Hawaii	KH6DLD	4,095
"	KH6CKO	1,668
Idaho	K7MRX	4,830
Illinois	K9CQF	7,354
"	K9TRP	4,133
"	K9UJT	1,073
Iowa	KØTBV	3,071
Kansas	KØHEU	7,215
"	KØGIC	5,346
Louisiana	K5TXQ	5,750
"	K5SBN	5,700
"	W4KZT/5	4,831
Maine	K1LCI	4,354
"	K1ADY	3,936
Massachusetts		
E. Mass.	K1IZT	11,285
" "	W1ZEN	2,640
" "	K1EKO	1,763
W. Mass.	W1YPT	5,832
Michigan	K8LHF	5,940
"	W8VRH	3,278
"	W8WUT	1,781
Minnesota	KØIKL	7,735
Montana	W7TGG	6,545
"	K7CHA	5,253
Nebraska	KØJFO	6,565
New Jersey (Southern)	W4HWR/2	1,763
" " "	W5RFK/2	325
New Mexico	W5RZJ	1,789
New York		
Eastern N.Y.	W2EWO	3,212
N.Y.C.	K2JYZ	8,960
"	WA2GPT	1,323
Ohio	K8MZT	7,280
"	W8HWX	5,313
"	K8ITF	3,469
Oklahoma	K5BNQ	14,300
Oregon	W7CSQ	6,180
"	K7ADI	5,640
"	W7DIC	3,895
"	W7HHH	1,144
"	W7DIF	788
"	K7JPI	374
Oregon	W7NJS	170
Pennsylvania (Eastern)	K3NMD	6,063
Rhode Island	K1DWH	925
South Carolina	K4LSI	2,850
South Dakota	WØZWL	3,588
Texas		
North Texas	K5YIB	13,920
" "	W5HWK	3,278
" "	K5MTF	594
South "	K5BJU	13,735
" "	K5OPT	10,465
" "	W5ZPD	9,610
" "	K5PFF	2,970
" "	K5OPV	1,380
Virginia	K4CZP	4,418
Washington	K7CPB	1,102
"	K7HSB	1,050
West Virginia	K8MQB	20
Wisconsin	K9TUD	4,050
West Indies (Puerto Rico)	KP4APX	4,485
Mexico	XE1VS	163
Portugal	CT1YE	1,596
Peru	OA4GR	1,364
Africa (South)	ZS5OB	978
" "	ZS2MH	151
Canada		
Ontario	VE3DDA	489
Alberta	VE6YW	736
England	G8LY	11
Finland	OH5SM	20
Japan	JA1YL	1,050
"	JA1AEQ/9	60

YL VHF CONTEST

A *new* contest conducted by the YLRL! *All* licensed YL operators are invited to participate in the first YL v.h.f. contest, to be held April 12 and 13, using frequencies from 50 Mc. up.

YLRL vice president Onie Woodward, W1ZEN, invites comments from participants after the contest. (See W1ZEN's address on the next page.) A special award by the Women Radio Operators of New England YL club will be given to the highest scoring YLRL member. Contacts with OMs will not count in this contest. Read on for the details.

Eligibility: All licensed YL and XYL operators are invited to participate. YLRL members only are eligible for the WRONE award. A non-member will receive a certificate. Contacts with OMs will not count. A special certificate will be given to the highest scoring novice.

Operation: Bands: 50 Mc. and above are to be used, phone and/or c.w. Crossband operation is not permitted. Only one contact with each station will be counted. A section may be counted only once toward multipliers.

Start: Wednesday, April 12, 1961, at 12 noon EST
End: Thursday, April 13, 1961, at 12 midnight EST

Procedure: Call "CQ YL".

Exchange: Station worked, QSO number, RST report, ARRL section, U. S. possession, VE district or country. Entries in log should also show band worked at time of contact, whether A1 or A3, time of contact, date, transmitter, and power.

Scoring: Multiply number of contacts by the total number of ARRL sections, U. S. possessions, VE districts or countries worked. Contestants running 50 watts input or less at

all times may multiply the result by 1.25 — low power multiplier.

Awards: Highest score — WRONE award (to a YLRL member only). Top three scores will receive certificates. Highest scorer in each ARRL section, U. S. possession, VE district and country will receive a certificate. The highest novice scorer will receive a certificate.

Logs: Copies of all logs must show claimed score, be signed by the operator and be postmarked no later than April 28, 1961, and received no later than May 12, 1961. Send copies of logs to Onie Woodward, W1ZEN, 14 Emmett St., Marlboro, Mass. No logs will be returned — be sure it is a copy of your log that you send for confirmation.

COMING EVENTS

YL-OM Contest — sponsored by the YLRL. Phone section Feb. 25–26; C.w. section March 11–12. Rules in January column.

(*Continued on page 132*)



A fast trip by 707 jet from Broken Arrow, Okla., to Santa Monica, Calif., enabled 1961 YLRL President Doris Anderson, K5BNQ, to receive the club files in person from outgoing President Gladys Eastman, W6DXI. On New Year's Day W6DXI (left) and K5BNQ (center) met at the home of YLRL Historian Vada Letcher, W6CEE (right) for the exchange of the files. YLRLers will note too that K5BNQ is the top phone scorer in the 1960 AP. (*photo by W5IWL*)



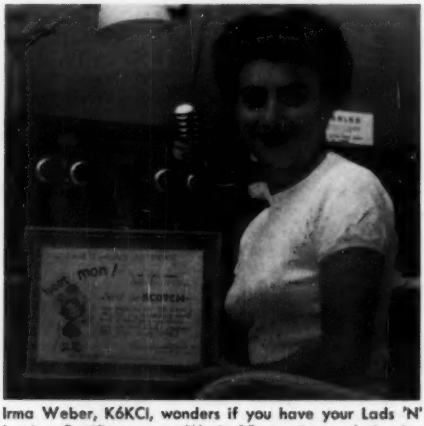
Several times one of the top AP or YL-OM contest winners, Barbie Houston, K5YIB, copped second place phone honors in the 1960 AP. Barbie, who is custodian of the WAC-YL certificate, calls attention to her correct address —Box 652, Richardson, Texas (not Garland as previously given here).



Third place c.w. winner in the AP was Louisiana YL Evelyn Ewing, K5TXQ. Licensed as a Novice in Jan. 1959, then as Conditional Class six months later, Evelyn already has worked 111 countries on 20 c.w.!



Nine-year-old Linda-Jean Pfeil of Tamaqua, Penna., has been on the air as KN3NEI since last September. A fifth-grade student, Linda-Jean has aspirations of getting her General Class license before her Novice year is up. KN3NEI's proud dad is W3KJJ.



Irma Weber, K6KCI, wonders if you have your Lads 'N' Lassies Certificate too. Work 10 members of the Los Angeles YLRC and send log extract with return postage to custodian K6KCI at 762 Juanita Ave., Santa Barbara, California. Since 1952, 279 certificates have been issued. (*photo by W6USE*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who?

Once a lid, always a lid.
— K6YAR

Thus in pure jest spake the son of K6CJF, amazed at his OM's uncanny ability to work DX rarities more by accident than by design. K6YAR's proposition is rather topical now, at the halfway pause in ARRL's 27th DX Contest, for contests are as fine a vehicle for unmitigated lidmanship as for laudable wireless work.

Just what *is* a lid? That's an interesting study in definition, and we think we know what K6CJF's offspring has in mind. The ARRL *Radio Amateur's Handbook*[1] defines the term as "a poor operator." True, but there's divergent opinion as to what constitutes a poor operator. Some would apply the label indiscriminately to any slow and inexperienced communicator. This, we think, is gross error. Status as a poor operator need not necessarily l..ge on any one or all of such factors as code speed, phone know-how, technical ability and ham experience. We've encountered atrocious lids demonstrably wealthy in all these departments, and we've observed consistently commendable operation by amateurs somewhat deficient in all.

So we should search beyond mere dexterity for a common lid denominator. Let's try this one: *A poor operator is one who operates improperly.* Seems to fill the bill — slow operators need not necessarily be lids, and fast clever chaps can be the very worst kind. Improper operating is a matter of degree; so is lidmanship. One may operate improperly only on occasion, as in hysterical pursuit of a new country; there are part-time lids who bear this out.

Persistent improper operation — being a poor operator, a lid — thus appears to derive in essence from sources of attitude and ethics. And these are components basic to that all-inclusive human aura called *personality*. Can one fundamentally change one's personality? Rarely in maturity, unless key underlying physical or mental causatives are operable. Even the chronic lid who repents with superhuman effort and goes on the wagon has two strikes against him. This was once put to verse:

> No scruples had Sloppy O'Squee
> While rolling up two-twenty-three.
> Now he vows he's reformed
> But a rep so deformed
> Remains that way permanent-ly.

In other words, and generalizing: Once a jerk, always a jerk. We're inclined to go along with K6YAR until we find enough exceptions to disprove the rule.

* 7862-B West Lawrence Ave., Chicago, 31, Ill..

[1] The 1961 edition is getting around. Got yours?

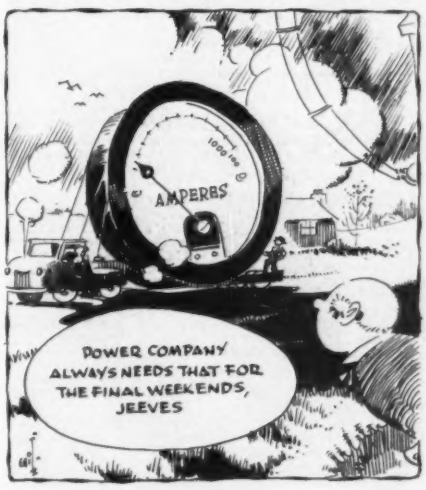
What:

The concluding March week ends of ARRL's annual DX stomp should be peppier than last month's sessions. There's the vernal equinox coming along, for one reason, a period when dormant propagation paths spring back to life if only erratically and temporarily. Nothing dormant about friendly

40 c.w., a range now fully restored to prominence as a prime DX source. Our mailbag is swelled by reports from **W1**GDB, **K3s** BVV KHK, **K4**ZRA, KN5ERQ, **K6s** CJF LAE, **WA6s** IVM JVD NNJ (ex-WA2BLP) WV6BLP, **W7s** DJU LZF POU, K7KXG, **K8s** HFJ JCB QEX, KN8VIX, **W9**JJN, **K9**UCR, **KØ**VXU (27/7 worked/confirmed countries), KH6DVG, listener A. Rugg, ISWL and VERON concerning 7-Mc. success with **CEs** IDC 2DZ (7005 kc.) 0700 GMT, **3F**K 4EC (10) 4, **CMs** 2UZ (15) 3, 2WS 5HF, **CNs** 2BK (15) 18, **8J**R 8MB 8MZ, **COs** 2CT (15) 5, 2MB 4, 2PY (10) 6–7, 5RV (5) 4, 8EM (15) 4, **CT1**HX (21) 7–8, **CX1**OP, **DU7**SV, **EL4**A (8) 5–6, **FA9**UO, **FB8**XX (25) 20–21, **FG7**XF, **HA7**KPF, **HCs** 1LE 2AC 2VT 5MH, **HKs** 2NF (32), 4JC 6IC 7ZT, **HV1**CN (3) 23, **HZ1**AB 22, **IS1**MM (10) 7, **IT1**AGA (7) 3, two dozen JA1s, **JAs** 2BP 2UJ 2XE 2XW 3AIS 3BDO 3CCQ 4NV 5FQ 5HD 5MZ 5VX 6ACZ 6BLX 7AKV 7LK JVJ 7XM 7WB 8AI 8BI 8HO 8LN ØVZ all around sun-up, **KG4**AP **KR6**QW, **KV4**CI (1) 22, **LAs** 1NG/p and 2NG/p of Svalbard, **LZ1**s KSP K8V (1) 4–5, **MP4**s BCV QAR (3) 23, TAK (15) 22, **OD5**s CT LX (2) 23, **OE6**KZ (1) 6–7, **OK**s galore, **OY7**ML (10) 23, **ST2**AR, **SV9**s WI WK WQ, **TF5**TP, **UAs** 9KAJ 9AG 9EH ØKAE ØKAR ØKCA 15, ØKID 14–16, UB5s a-plenty, **UA2**KAA, **UC2**KAB, **UF6**AA, **UG6**KAA, **UH8**BI (35) 22, **UM8**KAB (15) 22, **UO5**s AS KAA ZN, **UR2**s BU KAE, **UW3**TB, VE8ME, VO1FB, **VPs** 2DQ 2FQ 2LD 2LL 2SC 2VA 2VH (10) 4, 4BO 4LE (1) 3–4, 4RL 6AF 6AG 7BP 9EP 9EU, **VQ4**s DT GQ (14) 20, HT (18) 20, **VSs** 1AP (10) 15, 1FS (20) 23–0, 1FW (10) 15, 9GA 9OA (20) 21, **VR2**DK **VU2**s NR XG (13) 20, **XE2**s IE KH, **YNs** 1KA 3, 4AB (32) 1, a mass of seething YO-YUs, **YV4**s AZ (2) 2–3, BE, a pack of YV5s, **ZB1**FN, **ZC4**AK, **ZE5**JT, **ZP9**AY, loads of ZLs and ZSs, **3V8**CA, **4X4**s DH DR JO JU QM, **5A1**VA (12) 7, **5N2**s GUP JKO, **7G1**A (9) 3, **9M2**s FK and FS (10) 15.

Phone followers of 40 are reticent, but we see W2KKT W5CFJ, WA6NNJ and ISWL consorting with such items as **HC1**KA*, **UB5**FT, **UR2**KAE, **VP7BP*** (203) 0–1, **VS9**OC, **ZB2**AD and **4X4**GB, asterisks indicating s.s.b. Are you phone men losing juicy 7-Mc. DX by sheer default?

80 c.w., still somewhat reluctant on the long haul, sees K5CDA/mm, W7LZF, ISWL and VERON statie-eaters making the grade with **JA1**HQ 14, **LX3**AH, **KV4**CI (1) 2, **SPs** 5ZA 8ADF 8CK (1) 5, **SVØ**WI (7) 18, **UAs** 3CA 3GM 3LI 3PZ 6MK 9CM 9DN, **UB5s** AS KAA, **VK2**WH





ZB2AD is mighty popular these days on phone and c.w. with a Geloso receiver, British-type DX-40, dipoles for 14, 21 and 28 Mc., and a Windom wire for 40 and 80 meters. (Photo by MP4QAO via K2UYG)

(5) 10, **VS9DU** (18) 6, **YV5BJ** (32) 7–8, **ZB1FA**, **ZL2**s 2FT 3JT (5) 10, 4IE and **4X4FS**. . . . . The same team notes 75-meter phones **CN9CD**, **CT1KD**, **FA2ZY**, **LX1**s DE (272) and 8J (200) doing brisk trade upband.

20 c.w. loses some of its faithful to bountiful 7 Mc. but the day shift stands pat, including W1s GDB WDD, K1s IMD JFF (87/75), K2s TDI UYG, WA2s EFN KMY (110/88), K3KHK (72/62), K4s KYB MZU (121/93), YEP (110), ZRA (64/35), W5EHY, K5s VTA YAA, W6s JQB RCV, K6s CJF (124/112), LAE (184/174), QPG ROU, WA6JVD, W7s DJU POU (77/56), K7KBN, W8s KML KX (201/193), YGR, K8s JCB (143/124), QEX, K9s QMJ UCG UCR UIY, KØs OSV OSW QHF RNK UTX, tuner KN8VIX, KH6DVG (52/12), EL4A, G8PL, Z82U and OM Rugg. Here's why: **BV1**s US 14, USC, **CE**s 1BD 2GN ØAD (62) 2–3, **CN**s 2AY 8MB 9CF, **CM8RM**, COs in quantity, **CR**s 6CJ 7CI (40) 5, 9AH, **EA**s 8BW 8CG 21, 8CP 9AD 9AP (14) 22, **EL4A** (12) 6–7, **EP**s 1AD (60) 15–19, 5X, **ET2US**, F9UC/**FC** (70) 15, **FA3GT**, **FB8**s CE (15) 4–5, 8XX 8YY 8ZZ 14, **FE8AI**, **FF8**s CW (70) 0, CY, **FG7XF** (2) 22, **FQ8**s AJ (20) 6–18, HO, **FR7ZD**, **HC**s 1JU 2CS 5CN, **HI8DGH**, a large assortment of HHs and HKs led by **HKØAI** of San Andres, **HL9**-KT (15) 23, **HP1**8B, IT1s AGA TAI 22, slews of JAs, **JT1KAC**, **JY1XY** (35) 4–5, K7NDH/VE8, **KA5MC**, **KG1**s BB CD FD, **KJ6BV**, **KM6**s BI BQ CB, **KR6**s GP LD (74) 1, **KV4**s AA (81) 20–22, BK CI, **KW6**s DF DG (11), LA1NG/p, **LJ3G** of Norway, far-southern **LUs** 1**ZI** 1**ZC** 1**ZO** (24) 4, 6**ZL** (75) 8, 7**ZI**, LUØs AC AW, **LZ1KSZ**, **MP4**s BCV QAQ TAI (53) 4, TAK, **OD5AI**, **OR4**s TX 11, TZ (30) 5 of Antarctica, **OX3**s NK UD, **OY3GA**, **PJ3AK** 0, **PZ1**s AY (7) 23, BX (10) 23, **SL3**s ZB and ZJ of Sweden, **SMs** 2BCS 5BUG/**9Q5** (38) 5 5KV/**9Q5**, **ST2AR**, **TF3AB** (20) 0, **TI2**s DN PZ, **UA9**s AP DT KAC KDL KOG OM, **UAØ**s BF 3, BP (18) 3, EH KAE KCA KFM KID KKB KKD 2, KQB KZB, many UB5s, **UC2AG**, **UD6KAF**, **UF6**s FB (55) 6, KAB, **UG6KAA**, **UJ8**s AI KAA, **UL7**s KAA LE, **UM8**s DQ KAB 15, KAC, **UO5PK** 17, **UP2**s AC KAB KNP (80) 17, **UQ2AS**, **UR2KAA**, **UW9KCA**, VEs 1AF/-**VQ8** 8RW 8RX 8YD ØMC (55), ØNK, **VK**s 1JE ØJM 5, **VO1DX** (18), **VPs** 1SS 2LD 3, 3ER 4TR 6RG 21, **7NA** 7NQ 8DG (50) 23, 8EZ (20, 80) 23–1, 8FG (50) 0, 9EP 9EU, **VQs** 2FJ 4GQ 19, 4GT 5GJ 5IG 19, 5LD 8BC (45) 13–18, **VKs** 2DK (70) 7, 3L, **VSs** 1AP 1FZ 9AAC 15, 9AC 9OA 19, **VU2**s AK BG JG MD NR XG, Ws 4GEF/VO1 8OLJ/PK 14, **XEs** 1AX 4, 1B 1H 2LA, **XZ2TH** (10) 17, **YNs** 1AC 22, 1ES 4AB (55), **YO6AW**, **YS1O**, **YVs** 3AS 3CZ (50), 4CI 5BJ, **ZBs** 1A 2AD 2J, **ZC4**s AK (33), WD 17, **ZDs** 1CM 19, 2KHK/nc 9AM, **ZE8JO** (32), **ZKs** 1AK (35) 7, 1**BS** 2AD (85) 8, **ZL3VH/3** (78) 8 of Chatham, **ZP5OG**, **ZSs** 3HX (62) 23, 3IS 4MG 7M 7R, **4X4MB**, **5N2**s (ex-ZD2s) DCP (35) 7, GUP JM PJ (90) 6, **6O1MT** 4, **7G1A** (16) 0, **9Q5SF** and **9U5MC**.

20 **phone** is a cup of DX tea for K2TDI*, K3CUI, W4LJV, K4MZU*, W5CFJ, K5YAA*, K8JCB, K9QMJ, KØQHF, KH6DVG*, Z82U, s.w.l.s KN8VIX, D. Edger, E. Hammill and A. Hovey. The invigorating brew: **AP2M** 16, **BV1USC***, **CE2CCC***, **CRs** 6BX 6CA* (348) 1, 7EV, **CTs** 2AH* 3AA* 3AV*, **EA8s** BA* CT* EL4E, **EP2AG***, **FF8s** CU CW*, **FR7ZD**, **HC1s** IF RB*, **HHs** 2JT* 2Y (180) 4, 5DM 6DH, **HR1HP** (190) 2, **HZ1AB***, K6CQV/**KS6*** (320) 6, **KC4s** USB* USH* USZ* (285) 2, **KGs** 1BA* 1CO* 1CQ* 1FR* 1FS* 4AE, **KV4BQ***, **KW6**s CL* (310) 6, **KX6s** BU* DA, **MP4s** QAQ* QAR* TAI* TAQ*, **OAs** 5G* 7Q*, **OD5AU** 19, **PJ3AJ**, **TIs** 2AZ 2EH* (319) 4, 2WR* (330) 22, 5GJ (201) 7, **UAs** 3CR* 3DR* 4FE*, **UL7JA*** (310) 16–19, **UR2s** AK* AC*, **VKØIC** 11, **VPs** 6WD* 8EI* 9DC* (123) 3, 9FR*, **VQ8AR**, **VS4JT**, **VU2s** PS NR*, **VS4JT**, **XE1JP**, **YN1s** MW TAT* (340) 4, YV1EE (190) 5, **ZS7P***, **9G1s** BQ* CN*, **9K2AN***, **9M2s** DB* GA, **9N1s** CJ* MD* MM and SM*, all asterisks designating s.s.b. effort.

15 **phone** takes the propagational cake this month, with K1IMD, K2TDI*, WA2CLQ, W4s LJV UWC*, K4MPE, K5s QPG VTA, K6LAE, WA6JVD, K8s JCB TJW, K9s ORC QMJ, **KØRNK**, EL4A, KH6DVG, VE3PV, Z82U, s.w.l.s. Edger, Hammill, Hovey and R. Kemp logging things like **CEs** 3RC* 3TN (245) 23, 5EQ, **CN8**s EV 19, JO, **CO8**s JK RA, **CPs** 1BW 5EA (275) 23, 5EL*, **CRs** 4AX 6BX (198) 20, **CT1**s PK (200) 20, 8X, **CXs** 4AW 9BA*, **EA8**CD, **ELs** 1C* 1D 2R 2V 4L*, **FQ8HZ** (235) 19, **GD3**-ENK*, a hatful of HH-HC-HK gents, **HKØAI**, **HI8DGC**, **HPIs** AC GA HC 22–23, **HRs** 1DL 1MM (210) 22, 3PD, **HV1CN***, **HZ1AB***, Ks 4CDA/VE8 on Resolution, 5KWH/VE8* (438), **KC4s** USB* USN* (416) 23, USV (396) 0, **KA2MM***, **KGs** 4AO 4AV 6FAE*, **KM6s** BI* BV*, **KW6DG**, **KX6BQ***, **OA4GP**, **OD5CT***, **OX3DL**, **OY7ML***, **PJs** 2MC*, 3AH, **PZ1s** AX* BE BW, **TF2WFF***, **TI2s** AB MEQ RMA, **UA4FE***, VO2s CO* (433) RN, **VPs** 2FM 2SL 2VA 3EFG (230) 23, 3RW 5EM 5RA (238) 23, 5WF 6WR 6ZF 7BM 7BN* 8DW (259) 23, 8FW, 9DC* (406) 0, 9WB, **VQs** 2AB* 4RF*, **VRs** 2BC 2DF 1, 3L, **VSs** 5GS 14, 9MB 9 of the Maldives, **XEs** 2FFX 2OV (315) 1, 2RE (300) 22, 3CP (278) 0, YNs and YVs en mass, **ZD6DT**, **ZEs** 4JN 5JJ, **ZP6BB***, **ZSs** 3HT (200) 22, 4LT*, **3V8CA***, **5A3TX***, **5N2JKO**, **9G1CC** (265) 17, **9N1SM***, **9Qs** 5EC* 7ZZ and **9U5PD** 10. Sure, asterisks mean single sideband.

15 c.w. satisfies "How's" contributors K1s IMD JFF, WA2s CLQ EFN KMY, K3KHK, K4s MPE (119/-77), ZRA, W5s CFJ EHY, K5s QPG VTA, W6RCV, K6CJF, WA6JVD, W7POU, K7KXG, W8s KML YGR, K8s JCB QEX TJW (42/9), K9s ORC QMJ, KØs OSV OSW UTX PQW (33/28), EL4A, KH6DVG, VE3PV, auditors A. Hammill and KN8VIX because of **CEs** 1AD 3LV ØAD, **CN8**CS, **CO2PY**, **CR5AR** (47) 21, **CT1**s HX KD QN, CX7CO, **DM3**KML, **EAs** 8DL (108) 17, 9AP, **HAs** 5KFR 9OZ, **HCs** 1LE 2VT (20) 0, 3AH, **HH2GR**, **HK5CR**, **HP1**-SB, **JAs** 1AAW 1BQZ 3BV 4AQE 6MZ ØAQ, **KA2JL**, **KGs** 1FD 6AII 6AJT, **KM6s** BI BQ BV, **KR6JM**, **KW6s** DF DG, roving LUØAC, **LZ1s** BZ (40), KSG KSZ (37) 14, **OA3D**, **OE1RZ**, **PJ2s** AD CJ, **PY7LJ** of Fernando de Noronha, **SVØWI**, **TG9BK**, **TI2s** CMF DL LA WA, **UAØs** EH (35), GF KIA KKB, **UB5s** AQ KDS UG (38) 15, WI, **UQ2AN**, **VK9XK**, **VPs** 1JH 4BO (10) 18, **7NT 8EH**, **VQs** 2HD (50) 21, 3HZ (80) 19, **WP4AXN** (175), **XEs** 1XZ ØNHD, **YN1s** CAA (30) 22, RH (55) 17, **YO6AW**, **YJ1AA**, YVs 1EH 1EM 5AEZ (50) 22, possible ZA1AA, **ZC4SC**, **ZE6JS**, **ZK1BS** (76) 1, **ZP9AY**, **ZS7s** L M, **4X4FU** (35) 17, **5N2s** AMS ATU GUP, **5A3TN** and **9Q5US**. These central Africa entries are really getting the works whenever they show: **FF8s** AC CW BF (54) 20, **FQ8s** AX HD (75) 21 and HP.

15 **Novice** holdouts KN5s ERQ ETA FLA, KN8s UKH VIX and **KNØBQI** put the DX finger on **CR5AR**, G2WQ (90), **DL1IB**, **HC1JU**, K8KIK/VO1, **KG4AB**, **KM6BT**, **JA6MW**, **PYs** 2RT 4GA, VO1FK, **XE1s** RQ VB 16, **WL7s** DMO and DNK . . . . . Over in England WA6CYT hears potent r.f. from KN1s NEI OGO OXB PTM, WV2NXS, KN3s LWP NMK, KN4s NOZ WJB YFG, WV6s LSX MCI, KN7LUT, KN8UHB, KN9s BYC WRQ, **KNØs** BMC DFH and DNE on 21 Mc.

10 **phone** may be flinching from ionospheric vicissitudes but K1IMD, K2TDI*, W4LJV, K4s MZU ZRA, W5CFJ, K5s VTA YAA*, W6s JQB RCV, K6CJF, WA6IVM, W8s KML YGR, K8s JCB QEX, K9QMJ, KØs PQW RNK UTX VXU, Z82U, Messrs. Edger, Hammill, Hovey and Kemp get along great with **CE5EQ** 16, **CO8JK** (490) 16, **CRs** 6AT 6LA (460) 18, 7BC 7CI 16, 7EA, **CT1**s EY JP SX, **CXs** 2BG 3AM (563) 0, 4CS, **EA8s** BF (350) 17, CM, **ELs** 1D 2F (295) 17, 4A 4B 8D (440) 17, **FF8CK** 18, GB2SM (471) 16 of England, **GC2AAO** (305) 17, **HCs** 1AM 1DL 4RC (470) 23, **HE9LAA** (490) 15, **HH2**s RV V, **HI8**s DGH 20, DGC JSM, **HKØAI**, **HP1AC**, **HR1HP**, **JAs** 1ANA 1CEY 0–23, 2KX (420) 23, 2YL 2ZP 3CE 7JU (460) 0, K4SDC/**CN8*** 18, **KG6AJT***, **KJ6BV** (504), **KM6BU** (680) 0, **KW6CL*** (670) 0, **KX6s** BQ* BU*, **OD5CV**, **OE2WR**, **PZ1AY** (360) 21, **TG5HC** (813) 0, **TIs** 2OE 16, 5RV 17, **UAØLBQ** 0, **UB5CZ**, **UP2s** KAU NCH (470) 15, **UR2BU**, VO2WW, **VPs** 2DA 4MM 5BB 6AM 6FO 6JK 6TR 6WR 7BM 8, 7NF* 7NT* 7NY 17, 9DL 9DV 16, 9FR 16, **VQs** 2PZ (415) 18, 3PBD (433) 19, **VR2BC**, WØALL/VO1, **XEs** 1BBP 1CQ (490) 20, 1JP 3CP (1138) 20, **YNs** 1LC 1WW 4CB, **YVs** 1DH 3DB (475) 20, 6CN, **YS1LA**, **ZEs** 1JN 3JU 6JL 7JV, **ZLs** 1AWG 1RI 2UD 19, **ZSs** 3HX 4IM (342) 18, 4JO (345) 18, 7L, **9G1DP**, **9Q5s** DQ CK (478) 20 of Katanga, **9U5s** DM and PD.

10 c.w. still is good for WA2s EFN KMY, K4s DWU YEP, W5s CFJ EHY, K5s QPG VTA, W6RCV, K6CJF, WA6IVM, K7KBN, W8YGR, K8JCB, W9CLH, WØLNT, KØs PQW RNK UTX and scanner Rugg, producing skip from **CN8DJ** 9, **CR4AX**, **CXs** 2AZ 17, 2BG 2BT 7CO, **EL4A** 10, **GD3UB** 17, **GC8DO** 12, **HK7ZT** 16, I1ER (23) 16, **JAs** 1AEC (64) 0, 1AHS (90) 23, 1ALK 1BEH (66) 23, 1CNB 1CON 1CSP (84) 1, 1EM 1GV 17, 2ZNX

2XW 3APY 3AVD (82) 23, 3KM, 4OK/7 5IM 5KF (70) 23, 8AAC (60), 9CQ 18, **KGs** 4AD (100) 4AT 17, **6**AJG 6AJT (39) 22, **KW6s** DF (65) 0, DG (49) 17, LUØAC, **PY**7LJ 16, **SL**5ZL (50), **TI**2WA 18, **VK**2GW, **VQs** 2EW 8BM, **XE**1s H PJ 10, **YN**1RH, **YV**1RH, **YV**4CI, **ZK**1BS, **ZL**2-AUM, **ZS**7M (90) 19, **5As** 3TR and 5TA 16.

160 c.w.'s winter season DXploded with Christmas-time transatlantics and a W1BB-HH2V QSO for Stew's 55th 1.8-Mc. country. W1BB and KH6IDVG tip us off on the low-band activities of **DLs** 1FF 3GZ, **Gs** 2IM 3KOR 3KOX 3KZW 3NXJ 3NXV 3OLI 3PU 5AQ 6BQ 6HB, **GMs** 2BUD 3EHI, **HB9QA**, **KH6s** DVD DVG IJ **OKs** 1KM 2BBT 3KBB, **VP3**AD, **ZC4**AK and **ZL3**RB . . . . . Say, if you think 160-meter DX need be particularly circumscript, s.w.l. Tyndall of Vermont, a member of the Newark News Radio Club, claims 123 countries heard and verified on the broadcast band. Listener Stanbury of Ontario has 86. Meanwhile, a Marylander named Holbrook has confirmed reception of 35 countries on frequencies below 550 kc. *Dig*, men!

Where:

Asia — From K7CJX: "I've noticed comments in *QST* over the last few years about a certain HZ2AEH who operated at Taif, Saudi Arabia, in 1955 and '56, so I figure it's time to crawl out of the bushes and present myself. As you know, it's next to impossible for an American to get permission to activate an amateur station in Saudi Arabia. After six months of trying, I was able to get special permission to operate for the months of December, 1955, and January, '56. Two days before I was to commence operation I was issued the call HZ2AEH. (This should have been HZ1AEH but there was no time to get it changed.) I still have my log books. If anyone did not get his deserved QSL he can write me at [the address to follow]. I would like it stressed that no one else is authorized to QSL for HZ2-AEH. Self-addressed stamped envelopes will be much appreciated from W/Ks, International Reply Coupons from overseas applicants." Bill just returned from a two-year DL4IJ hitch and so will accommodate inquiries on his Germany activity as well . . . . . "I expect to be QSL manager for HM1AP," writes YL K6QPG, "W/Ks only. I want it understood that s.a.s.e. are required, and QSO data *must* be in GMT." . . . . . In addition to the EP2AF address in the roster to follow, OM Sanderson suggests "U.S. Embassy, Tehran, Iran," for non-W/K applicants . . . . . "Transferred back to Washington," notifies ex-9N1GW. "You might pass the word along that I have my logs with me and, if anyone failed to receive his rightful card, he can drop me a line [to the address that follows]. I still have quite a stack of QSLs and would like to make sure that nobody was missed." . . . . . "September's column mentioned OT ex-AP2N being back in the DX swim as VU2RG," writes VE2BV. "This rang a bell. I checked my index, found AP2N in the log, and noted that no QSL had been received from Norm. I dropped him another card to his new VU address, explained the situation, and back came an AP2N confirmation. I don't suppose getting a QSL eleven years late is any world's record but it's certainly gratifying to me." . . . . . "Been getting so many s.w.l. cards," says EP1AD, "that I can answer only those that include postage defrayal. Most, by far, come from Europe." . . . . . Via ISWL: G3MRC, back at VS1FW (address follows), is willing to attend to any incomplete QSL business concerning past G3MRC, VS1FW and VS2FW operation.

Africa — "I will be QSL manager for EA8BA in the Canaries," advises W4MXL. "He's there in connection with Project Mercury and will probably operate until June." Nick intended to start dissemination by early February, s.a.s.e. required from W/Ks . . . . . W1BB hears from ex-8U1MS in Germany where Mahmud studies at old Heidelberg U. Ex-SU1MS welcomes QSL correspondence at the address to follow . . . . . WGDXC reports that W2-VCZ's QSL task in behalf of FF8CW (flyboy DL9KR) got well under way in mid-January . . . . . "Mail is very slow here now," mutters EL4A. "We get delivery about every ten days since our last company plane expired and scattered itself all over Monrovia's air field." . . . . . "Ex-CN8JE's address has changed many times," observes W2GIX. "He now says any QSLs still outstanding can be obtained from [the address to follow]." . . . . . Not so, learns K2TDI, running down a rumor that W5INL handles QSLs for Z87P. The pair are good friends but there's no QSL arrangement . . . . . From the archives of W8KX: "Z89IF/9 cards should be getting around by the time this appears in print. Lambert's QSL chores were held up by frequent travels on company business."

Oceania — "We've worked DXCC and nearly 6000 QSOs since August 20th," writes the KW6DF-KW6DG combo to W8KX. The latter figures that this QSL task should take quite a while but these Wake pasteboards already are getting around . . . . . KM6CB injects a plea for s.a.s.e. in lines to W6RCV . . . . . WGDXC's *DX Bulletin* has it that W6ZVQ assists with ZK2AD QSL matters for QSOs prior to 1960, and W9GFF is QSL agent for ZK2AD's 1960 contacts . . . . . W6EAY acknowledges receipt of a repeat QSL from VR6A8 for a 1954 QSO. Floyd evidently feels that his first batch of cards was inferior in quality, but W6EAY assures him that a scrap of paper is sufficient so long as it bears the proper information.

Europe — In response to inquiries by K2TDI and others, the address for the International Short Wave League's QSL bureau is 12 Gladwell Rd., London N.8, England . . . . . "It seems that LX1MJ, who works no c.w., has never talked to the States," observes R. Taylor, "Yet he receives many QSLs from the U.S.A. for c.w. QSOs." W3KKO joins to say that LX1s CX and XX also are deemed ungood by LX1DC, Luxembourg's QSL chief . . . . . "I'm handling the QSL situation for SP4JF," says WA2EFN. "Any station still awaiting his card should notify me and I'll take care of it." . . . . . "At F7HC I've tried to QSL 100 per cent," insists W5VYY. The address in the listing to follow may help any whose F7HC cards have strayed . . . . . WIA's *Amateur Radio* points out that the letter following the numeral in calls for DM3 club stations designates the operator on duty. DM3DA, for example, becomes DM3-ZDA, DM3YDA, etc., depending on who's at the switch. Where more than 26 operators are involved, the roster starts over, using the DM4 prefix.

South America — "I'm handling QSLs for ex-VP4WD," communicates WA6CYT from his post in England (address follows). "If anyone who worked VP4WD did not get a card I will issue one on receipt of a QSL bearing full QSO details." GMT, please . . . . . W1BAN aids CP5s EA and EL with QSL details. "Contacts with both Cochabamba stations can be confirmed on my receiving QSLs bearing proper information. Cards not accompanied by s.a.s.e. must be answered via bureau," Charlie gets his log transcript by 21-Mc. s.s.b. schedules . . . . . "I believe HKs are the best South American QSLers," cheers KØPQW. "Almost all respond immediately direct, many by air." . . . . . "OR4TZ, at 70° S and 24° E, will QSL via UBA's bureau," learns W8KX. Summer delivery can be expected, for the Belgian base changed antarctic personnel last month.

Hereabouts — "I'm now QSL manager for VP9EP," enlightens W3INH, S.a.s.e., of course . . . . . "Effective the first of this year I am QSL manager for VP6WD, at present the only Barbados station on s.s.b.," alerts W4OPM. "Log transcript will be received weekly by radio. S.a.s.e. or IRCs, whichever appropriate, will speed receipt of Mac's QSLs." . . . . . K3MJV/VO2 promises to cancel all QSL arrears as soon as blanks arrive. With conditions as spotty as they have been this winter, even VO2s rate pile-ups . . . . . From KØGZN: "HH2OT mails me copies of his log each week or so, but delivery of air mail is sometimes quite slow from this area; hence any delay on my end in answering QSLs. His cards do go out on the day the proper log is received." . . . . . "Those who worked me up to June 10, 1960, and who have not yet received QSLs will do so in the near future," assures VE8TG, ready to fire up back home as VE2YQ . . . . . W8KX salutes exceptional short-wave listeners whose reports often are more accurate and complete than that from the station being worked at the time. One thing a DX man usually likes to know is how he compares in signal strength with other DX hounds in his immediate area. (He usually has a pretty good idea, fellows, so don't put it on too thick.) W8KX also applauds the QSL-agency efforts of Ws 2CTN 3KVQ 4CKB 4TO 8EWS, Ks 6EC and ØDQI for prompt and efficient service. "Stateside QSL managers are doing a great job and expressions of thanks are in order whenever applying for the cards they are handling. They surely deserve to know that their time and energies are appreciated." By the way, the quarterly *DX-QSL Newsletter* of K6BX nears the 2000-listings mark in its pinpointing of Stateside and other DX-QSL routings. The serious country-chaser can hardly afford to pass it up . . . . . "We will QSL 100 per cent," assure W6s FYM and

CR7CI manages logfuls of 20-meter W/K/VE/VO contacts between flying assignments on the CR7-VQ2-ZE-ZS run. Antonio regularly schedules c.w. and phone sessions around 0300 GMT. (*Photo via W9NLJ*)





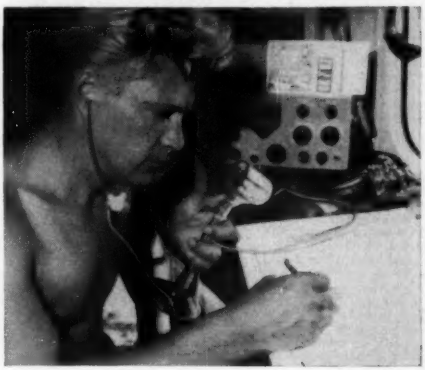


CT2BO (left) is probably the best known Azores DXer on our side of the ditch. Gil radiates consistently, 3.5 through 28 Mc., while neighbor CT2AK favors phone action on the higher frequencies. Line-voltage fluctuations and equipment scarcity hinder the hamming of most CT2s. *(Photos via K8IXZ)*

UF concerning the impending gala Nevada production of Eimac Radio Club's W6AY/7 . . . . . "I will QSL all contacts as soon as stock is received from the printer," guarantees VE8RX, who ran himself out of blanks with a flurry of W/K QSOs . . . . . VP7NA estimates that some 60 per cent of all QSLs sent his way have gone astray because of error concerning his address (correct version follows). "Another thing," he writes, "American amateurs do not seem to understand that U.S. postage is not good in the Bahamas. IRCs are okay, however." . . . . . *Help!* W1MGP seeks a tracer on the KG1EE he worked in early 1958. W2OST needs a hint re LZ1KNB ('57), WA2EFN is eager for a line anent XZ2BH ('59), and K4ZRA hungers for any word concerning OX3MT who is unrecognized by the EDR (Denmark) bureau . . . . . WA2GKX offers to assist a deserving rare-DX operator with QSL chores from the Stateside end . . . . . Huzzahs and a tiger for W1s DGL GDB UED WPO, K1LVW, W2GT, K2s QXG TDI, WA2KMY, K3s BVV KHK, K4s KYB MZU YEP, K5LXK, W6RCV, K6s ROU STZ, W7s DJU UVR, K7KXG, W8s KML KX, K8QEX, W9CLH, K9s ORC UIY, KØPQW, VE3PV, KH6DVG, G8PL, ZS2U, s.w.l. Edger, International Short Wave League, Japan DX Radio Club, Newark News Radio Club, Universal Radio DX Club, VERON of Holland, West Gulf DX Club and the Wireless Institute of Australia for their contribution of this registry of ready reference:

ex-CN8JE, H. Orr, 172 N.E. Logan Pkwy., Minneapolis 21, Minn.
CN8JO, M. Ramsay, APO 113, New York, N.Y.
CO8JK, Dr. F. Magran, P. O. Box 857, Santiago, Cuba
CP5s EA EL (via W1BAN)
CR4AX (to CT1RX)
CR5AR, P. O. Box 24/2a, Sao Thome, Portuguese W. Afr.
CT2AK, c/o L. Lyman (K8IXZ), 1936th AACS Sqdn., Box 95, APO 406, New York, N.Y.
EA8BA (via W4MXL)
EP2AF, R. Sanderson, U. S. Embassy, APO 205, New York, N.Y.
EP2AG, G. Buchanan, APO 205, New York, N.Y.
EP2AP, J. Heay, ex-KL7TI, USOM/CAAG, APO 205, New York, N.Y.
ET3RS, Box 3001, Addis Ababa, Ethiopia
F7AW (to K5LXK)
F7HC, c/o H. Hodge, 146 Naubuck Ave., E. Hartford, Conn.
FB8CQ, Ft. Dauphine, Madagascar
FF8AK, R. Chatonnet, P. O. Box 7, Rufisque, Senegal
FF8CU, P. Gariot, Nosoco, Zuichincho, Senegal
FL8AD, Sgt. Morin, BAI8M, Djibouti, Fr. Somaliland
FP8DC (to W1ISD)
FQ8AC, P. O. Box 2253, Brazzaville, Congo
FQ8AF (via REF)
FQ8AT, P. O. Box 12, Ati, Chad
FQ8HD, R. Robinson, P. O. Box 894, Brazzaville, Congo
FQ8HI, P. Stamm, P. O. Box 235, Ft. Lamy, Chad
FQ8HK, P. O. Box 919, Brazzaville, Congo
FQ8HT, P. O. Box 785, Bangui, C.A.R.
FQ8HW, 2 Esema, Faya Largeau, Chad
HB9WY, P. Indergand, Erstfeld/Uri, Switzerland
HC1IF, G. Dies, P. O. Box 69, Quito, Ecuador
HC8JU-HC9JU (to HC1JU)
HK3RQ (via LCRA)
HM1AP (via K6QPG)
HP1IE (via LPRA)
ex-HZ2AEH-DL4IJ, W. Brister, 11435 Pacific Hwy., Tacoma, Washington
IE1SMO, c/o Kradepohl, Deutzer Strasse 96, Dusseldorf-Eller, Germany
K3MJV/VO2, T/Sgt. E. Roberts, Box 73, 59th FIS, APO 677, New York, N.Y.
K5CDA/mm, M. Stout, SS *Penn Shipper,* Penn Shipping Co., 405 Park Ave., New York 22, N.Y.
K6CQV/KS6, P. Hodges, P. O. Box 307, Pago Pago, American Samoa
K7NDH/VE8, C. Grall, USCG Loran Stn., Cape Christian, Baffin Island, via APO 228, New York, N.Y.
ex-KA2AA, Lt. L. Laine, K4OMT, Opns. Dept., USS *Hancock,* CVA 19, c/o FPO, San Francisco, Calif.
KA2RT, S/Sgt. R. Temple, 56th Wea. Recon. Sqdn., Box 528, APO 328, San Francisco, Calif.
KH6ACU, D. Earhart, ex-W6UNP, 2159 St. Louis Dr., Honolulu, Hawaii
KL7KG (to W6KG)
KM6CB, Navy 3080, Box 23, FPO, San Francisco, Calif.
LA5AD/p, F. Hegre, Isfjord Radio, Spitzbergen, Norway
LA8FG/p, B. Skillingstad, Isfjord, Spitzbergen, Norway
LU6MI, P. O. Box 50, Lujan, Mendoza, Argentina
LU0AC (via WA2EBS)
LZ1KSF, T. Todoroff, LZ1HA, P. O. Box 205, Sofia, Bulgaria
MP4s BDD QAD QAQ TAI (to OD5CT)
MP4s QAR TAK (via W4TO)
OD5CS, c/o Lebanese Television Co., Beirut, Lebanon
OD5CT, L. Rundlett (W3ZA), P. O. Box 341, Beirut, Lebanon
OK7HZ/YI/etc., J. Hanzelka, c/o Czechoslovakian Embassy, New Delhi, India
PX1AI, Box 327, Andorra
PY7LJ, A. Pimentel, CIA Guardas, Fernando de Noronha, Brazil
SP4JF (via WA2EFN)
ex-SU1MS, M. Salam, Heidelberg-Rohrbach, Lucas Granach Str. 13, Bei Wagner, W. Germany
SV0WR, L. Mennitt, USCGC *Courier,* WAGR-410, FPO, New York, N.Y.

OK7HZ, shown here at his Baghdad OK7HZ/YI location, now has assignment in India where he finds it impossible to obtain VU transmitting authorization at this time. Jiri gads about through association with a well-traveled Czech scientific expedition. *(Photo via K2UYG)*



TF2WEZ, J. Casper, 1400th Air Base Sqdn., Box 86, APO 81, New York, N.Y.
TF2WFF (via W3KVQ)
UA3CR, Box 82, Moscow, U.S.S.R.
VE5MK/SU, J. McPherson, 56th Canadian Sig. Sqdn., UNAF Base P. O., Beirut, Lebanon
VE8RW, Naval Radio Stn., Aklavik, N.W.T., Canada
VE8RX, G. Kondo, Dept. of Transport, P. O. Box 65, Fort Smith, N.W.T., Canada
VE8TG, P. MacDougall, VE2YQ, 7025 Fielding Ave., Apt. 202, Montreal 29, P.Q., Canada
VE8YD, A. Conner, Federal Electric, Dorval Airport, Montreal, P.Q., Canada
VK9GP, R. Baty, Norfolk Island via Sydney, N.S.W., Australia
VP2LY, R. Rojas, Govt. Bdcstg. Stn., Castries, St. Lucia, West Indies
ex-VP4WD, c/o K. Lamonica (WA6CYT), 7500th AB-RON, APO 125, New York, N.Y.
VP6WD (via W4OPM)
VP7BP, P. O. Box 4187, Patrick AFB, Cocoa, Fla.
VP7NA, H. North, P. O. Box 5197, Nassau, Bahamas
VP8FE (via R8GB)
VP9EP (via W3INH)
VQ2WM, Box 12, Mufulira, No. Rhodesia
VQ5IG, Box 59, Entebbe, Uganda
VS1FW, B. Poole (G3MRC), 10th Submarine Sqdn., c/o FMO, Singapore
ex-VS2FW (to VS1FW)
ex-VS6EE, D. Phillips, 289 Mundon Rd., Maldon, Essex, England
W6AY/7, Eimac Radio Club, 301 Industrial Way, San Carlos, California
W6VHN/KH6, J. Houlihan, Box 8036, Honolulu, Hawaii
YN1AC (via K5GPE)
YN1RH, P. O. Box 1171, Managua, Nicaragua
YV5AEZ, A. Partidas, P. O. Box 4719, Caracas, Venezuela
YV5AMJ (via RCV)
YV6AV, c/o Mobiloil Co., Anaco, Venezuela
ZA1BC, Box 185, Tirana, Albania
ZC4WD (ex-VR3W) c/o Barrett, P. O. Box 219, Limassol, Cyprus
ZD2KHK/nc (via R8GB)
ZD9AM (via SARL)
ZE4JN (via W5RHW)
ZK2AD (see preceding text)
ZS5KB, 801 Umgeni Rd., Durban, S. Africa
ZS6AQI (via SARL)
ex-4S7FJ-VS1FJ, F/Sgt. F. Johnston, c/o Signals, RAF Linton-on-Ouse, nr. York, Yorks., England
5A2CV, RAF Club Stn., El Adem, Libya
5A2CW, B. Stone, P. O. Box 48, Tobruk, Libya (or to G3JFC)
5A5TA, J. Garrett (W5LAK), Box 638, Tripoli, Libya
5N2ESH, E. Sherlock, c/o John Holt (Nigeria) Ltd., P. O. Box 157, Lagos, Nigeria
5N2GUP (to ZD2GUP)
5N2PJ (via W7VEU)
9G1DH, Box 1177, Accra, Ghana
ex-9N1GW, G. Ward, W2CBD, 6844 Kerby Dr., Washington 22, D.C.
9Q2AA, Bakwanga, South Kasai, Africa
9Q5CK, P. O. Box 699, Jadotville, Katanga Republic, Africa
9U5BH, Fr. Florin, Astrida, Ruanda-Urundi

NOTE: Nothing necessarily accurate or "official" about the preceding addresses. Good luck!

Whence:

Asia — EP1AD (K4ORQ) writes ARRL Assistant Secretary W1UED of much DX ado in the Tehran region. In mid-December K4HOH, K5OIDC, KL7TI, KL7BOF and CN8FN were licensed as EP2s AF AG AP AQ and AJ, respectively, effectively doubling the Iran representation on DX bands. "Amateurs here have just organized a radio club to encourage hamming, to keep standards high, and to help monitor ourselves," informs EP1AD. "I'll soon have a G4ZU-type beam going on 40, 20 and 10 meters. Lately the south polar path to the States has been the only consistent route home." EP2AF adds, "I'm usually on 14-Mc. c.w. daily between 0230 and 0330 GMT, also 1400–1830. I'll try 10 and 15 meters as soon as I get a beam together." . . . . . Items from and about Japan: JA1DM spells JA1AG as editor of the lively Japan DX Radio Club organ which recently celebrated its 200th issue. . . . K6CJF reports spotty conditions holding JA 7-Mc. signal strengths far below peak. Bill now has worked 353 JAs, has confirmed 212, in 38 prefectures and 95 cities. . . . From W8KX: "JA2JW, with 190 countries verified, has never heard a VP2. PZ1s are almost unknown over there, too. JA2JW monitors 14,000–14,025 kc. daily from 2300 to 0100 GMT in search of Caribbean-area stations." . . . "I closed KA2AA in January after two wonderful years of DX operation," documents K4OMT. "Had a 105/90 countries total, worked WAC, WBE and all fifty States (not confirmed). Watch for K4OMT/6!" . . . . . K3CUI learns that Kazakhstan's first and only s.s.b. entry, UL7JA, likes 14,310 kc. around 1630–1800 GMT. UA3CR continues as the foremost Russian single-sideband DXer with a 128/100 tally . . . . . Interesting missive from HM1AP (formerly HM1AO) to K6QPG: "I am on 7, 14 and 21 Mc., mainly c.w. near 14,020 or 14,050 kc., 0830 to 1530 GMT. I use an 807 at 15 watts, a two-tube receiver and doublet antennas. I am the second c.w. HM station active and hope to have higher power, perhaps 30 or 50 watts, by spring. HM1s AA to AQ now are licensed here, also HMs 2AO and 4AQ. I was one of the operators at HM9A last November." Byong Joo Cho is with Korean National Airlines in Seoul . . . . . K2TDI reports that 9M2DB's s.s.b. activation doubled Malaya's carrierless contingent . . . . . WGDXC understands that AC4AX may do some AC3ing, and VERON keeps AP2CR's East Pakistan possibilities under close surveillance.

Africa — "ZD9AM," comments K2QXG, "expects to be on Gough for a few more months and is available Tuesdays and Thursdays between 1900 and 2000 GMT, usually near 14,018 kc." ZD9AM tolerates little nonsense from DX hogs, and YL ZS1RM often is on hand to expedite pile-up procedures . . . . . K2TDI finds the new s.s.b. outfit of CT3AV quite workable around 14,280 kc., 2000 GMT . . . . . VQ8BC anticipates a 30-month Mauritius sojourn, according to K2UYG. He's G3JKI when home . . . . . CR4AX becomes CT1RX once more, and K9VRV/4 feels his fluent English will be sorely missed by Cape Verde hunters . . . . . "ZS6IF says a lot of DXpeditions by central and north Africa amateurs are in the works to coincide with the ARRL Test," relays W8KX . . . . . W4MXL's friend EA8BA expects to be active for several months with 100 watts of s.s.b. on 14 Mc. . . . . "Looks as though I won't make that 24,000-QSO total I set out for when I came to Liberia in 1959," calculates EL4A (W7VCB). "Equipment breakdowns and poor conditions make things rough. A few of us are trying a local evening net on 3.7 Mc. Plenty of band space not in use in this part of the world, for most Africa stations are not designed to include 40 and 80 meters." Ken has s.s.b. inclinations nearing the planning stage . . . . . K8IXZ reports 5A4TR QRT and Stateside . . . . . Africa oddments courtesy VERON and WGDXC: DL9KR's favorite FF8CW spots are 14,070 and 21,070 kc. for c.w.; 14,290 and 21,405 kc., phone. He may try his DX hand in FF4 or FF7 one of these days. . . . VQ9JER (ZE4JN) joins VQ9TED's Seychelles-based campaign, and VQ9HB may be Chagos-bound come May. . . . Ex-HB9RS intends an emphatic ET3RS career.



UAØFG often finds his way into our monthly activity listings from vast far-off Siberia. (Photo via W7DJU)

Oceania — ZL2BX, a familiar log entry with the old DX school, will visit our shores in May. W5NZE, whose QTH is on Bob's itinerary, says ZL2BX will hit California first, then Texas, New Orleans, Miami, New York, and finally Europe before return to Wellington. He writes W5NZE: "This is something for which I have waited all my life. Now it becomes possible, for I have been granted leave of absence for six months from the organization that has supported me for almost forty years." . . . . . K2UYG finds FU8AC readying for a 14- and 21-Mc. phone and c.w. kick, and learns that somebody crassly appropriated FU8AA's call for 14-Mc. c.w. nonsense a year ago. FU8AE is expected back in the condominium but soon . . . . . If a VR5 shows up from Tonga, K2UYG feels ex-ZL5AE may be at the bottom of it . . . . . KX6BQ, through W6KPC, promises to have his new triband beam beaming on 14, 21 and 28 Mc. regularly 'twixt 2100 and 1200 GMT. s.s.b. . . . . K5CDA/mm has a Pacific DX ball aboard SS *Penn Shipper*. One interesting DX piece: W6MJF/mobile, tooling along at 65 m.p.h. on 7019 kc. Any Doppler, Max? . . . . . KR6KF offers revised rules for the Okinawa Amateur Radio Club Award, a certification based on five, ten, or twenty-five confirmed KR6 QSOs . . . . . "New record last week!" explodes VR2BC. "One WA6 phone called me 49 times without pause, then signed his own call twelve times. Naturally I didn't even consider coming back to him.

There's nothing like a snappy 3-by-3 to get results." Greg and W6UYE list VR2s AP BJ and DK now on single sideband with VR2DO about to give a mode a whirl . . . . . Pacifigrams via VERON and WGDXC: VK8TB (W4DPF) is making CR1Ø overtures. . . . VR6AD, 21,045 kc., is said to be former ZL1JT. . . . VE7ZM feels fit for his British Phoenix fling this month.

Europe — U.S.A. call-area c.w. leaders in the 1960 French Contest are W1WY, WA2DGG, W3YHR, W4HQN, W5LCF, W6BIL, W7PQE, W8AY8, K9GVE and WØMCX, with VE1FK leading the Canadian contingent. No W/K/-VE phones applied. This year's REF affair has its phone week end on the 15th and 16th of next month, commencing 1400 GMT and closing 2200 the following day. Exchanges will be the usual RS001, RS002, etc.; one point is earned for each F station (F FA FB FC, etc.) contact per band, this total to be multiplied by the sum of French departments per band, plus DUF List countries per band (Fs will indicate these in QSOs) and logs go to REF, B.P. 41-01, Paris . . . . . DARC (Germany) holds its biennial convention at Dortmund on May 19th-22nd. DL4BS states that this affair has bloomed into quite an international blowout. So, if you plan to be on the Continent in mid-May, by all means drop around. And buzz R8GB's G2BVN when passing through London town . . . . . Via K6BX: KØGHK is organizing a group Amateur Tour of Europe to run from the 22nd of April through May 10th. If you have the time, a spare kilobuck and a yen to give western Europe a thorough going-over with the spotlight on ham radio, *this* is for you . . . . . Pursuers of USKA's elusive *Helvetia XXII* certification may be interested in G8PL's research to the effect that HB9s BQ and YD hail from Unterwalden canton, HB9WY from Uri . . . . . LZ1KSF staffman LZ1HA is DX editor of Bulgaria's *Radio and TV* periodical. Thanks to K9AMC, Todor will have a W2EWL s.s.b. exciter and HQ-110 receiver ready for DX action soon . . . . . VE/VOs, lucky rascals, are invited to participate in R8GB's British Empire Radio Union Contest on the 11th and 12th of this month beginning 0001 GMT, Saturday, and ending 2359 on Sunday. This c.w.-only affair has the customary RST001, RST002, etc., serial exchanges and there's an interesting 25-watts-and-less class set aside for QRP sportsmen. Check with R8GB immediately for details on fil'ng your results before the April 1st deadline. W/Ks need not apply, darn it, and let's not badger the Commonwealth folk during their annual farflung "8S" party . . . . . K4PHY writes from Bad Kissengen where he hopes to be signing a DL call before long. Meanwhile Charles keeps his code speed shiny by duties as an Army c.w. operator using R-288 receivers and BC-610 senders . . . . . GI3KVQ welcomes inquiries about the WAGI certification, a sheepskin available to North Americans who confirm single contacts with Counties Antrim, Armagh, Derry and Down, plus a QSO with either Co. Tyrone or Co. Fermanagh, all communication dating after 1958 . . . . . Some sections of the Azores are swapping mains from 110 to 220 volts. K8IXZ, on the scene, says CT2s AC AK and BO must modify their gear accordingly, no easy stunt in view of the longstanding CT2 electronic parts shortage . . . . . F7s AW and HC have a whopping 100-ft.-high terminated rhombic at their disposal, something they'll surely miss when they respectively return to K5LXK and W5VYY . . . . . BARTG, the British radioteletype society whereof G2UK is secretary, claims a membership of 66. A recent club newsletter lists RTTY activity by F2SQ, G2s FGD UK, about twenty G3s, GM8FM, TG9AD, VK3KF, ZL3HJ and Z81FD . . . . . European addenda thanks to VERON and WGDXC: UA1s ZEA and ZEC are beginners said to be licensed but inactive in Franz Josef Land. . . . Kaliningrad is available through UA2s AC and KAW on 40 c.w., KAK on 20 c.w., and AO on 14-Mc. c.w. and sideband. . . . New OHØs NE and NF disport QRP on 40 and 15 meters.

South America — Looks like a lively DXpeditionary season upcoming on the north-south path. W9EVI & Co. are meshing gears for their Malpelo thrust, and W8KX mentions a Galapagos gallop by HC1JU and colleagues as HC8JU/HC9JU. The Ecuadorians hope to better the 1200-QSL batch dispatched after their similar undertaking a year ago . . . . . CP5EA's 60-ft.-high triband rotary sprays a flock of a.m. and s.s.b. signals Statesward on 15 and 20. A 10-B, BC-458 and 814 linear start things off . . . . . The HKØHCA team — 3200 contacts with 75 countries on sideband and c.w. in late November — consisted of HKØAI, YN1s CAA CK SK TAT, W8NWO and K8NZD . . . . . VERON declares that LU1ZC (20 c.w., 1930 GMT) serves a decidedly delicious South Sandwich with relish.

Hereabouts — The W9-DXCC aggregation, whose late-summer banquet meetings in Chicago have gained wide fame, now is headed up by president W9JUV and committeemen W9s ABA EVI FJB FKC GRV and WYB . . . . . Gee — hamdom, the world of DX especially, and "How's DX?" in particular lose two fine gentlemen with the passing of W2GVZ and KP4KD . . . . . W3s AEM ITW, KØs GZN and GZO join forces on a tour of the Caribbean for visits with HH2OT and other DXers down that way . . . . . W6KG's late-1960 DX eruption as KL7KG netted four kilocontacts. Lloyd has a challenging certification available for sheepskin-chasers. It's based on confirmed QSOs with one operator (or family) under different assigned calls. Consult W6KG for the fine points . . . . . VP2VB/mm nearly lost another *Yasme* to the watery elements after his recent FO8AN QSO binge. Daniel put into San Diego for repairs before continuing westward . . . . . "When I finish reading *QST* I ship it to friends in the eastern Europe region," writes s.w.l. E. Hammill. W8KX seconds the motion, pointing out that postage is no more than fifteen cents, for printed matter to any part of the world . . . . . W8KX also feels there should be more phone data in the column. "Lots of stuff on phone that I haven't worked," says Walt, "so here goes an old c.w. hound over to 15- and 20-meter voice." On the other hand, K2TDI has just discovered c.w.'s DX efficacy after racking up a hundred-odd countries on phone . . . . . "May be moving to Belgium," states K6LAE. No use, Dick — those Sixes will still clobber you like locals . . . . . *Yike!* The very first DX QSO for K9UCG was EP1AD . . . . . From 0700 GMT, April 22nd, to 0200 the 24th, Eimac Radio Club will pass out Nevada contacts to the overseas gang. Watch for W6AY/7 on (c.w.) 7005, 14,065, 21,065 and 28,065 kc.; (s.s.b.) 7215, 14,315, 21,415 and 28,665 kc. Separate kilowatts and a skyful of skyhooks are planned. "A.m. phones are invited to zero our single-sideband frequencies and we will be happy to give them Nevada," suggest W6s FYM and UF . . . . . K3MJV/VO2 warns, "Our new Goose Bay Amateur Radio Club house is nearly finished. Stand by for the grand r.f. opening!" . . . . . K2UTC, K5MWH, W7UVR and others independently file pleas for improved W/K deportment on DX bands. Local cross-town QSOs in prime DX regions of the higher-frequency phone bands, disregard of directional CQs, and generally boorish behavior are cited . . . . . 'Tis said that W4s BPD and TO are considering further DXpeditionary doings, and VP7BT (W6MHB) has his DX eye on St. Helena.

Ten Years Ago in "How's DX?" — ARRL's 17th International DX Competition has Jeeves really hoppin' in your March, 1951, column keynote . . . . . On 160 meters W1BB's startling QSO with HC1JW is a prime first. EK1AO and GD3UB also are crossing the waters to the W/K/VE gang . . . . . Eighty-meter men deal with HZ1KE, K8AA AC AI, VP5BM, YN1AA, ZD6RD and 9S4AX . . . . . The mob on 40 goes after OE13GI, TA3s FAS GVU, W1FXA/KW6 and ZD4AB . . . . . Twenty c.w. is jammed by AG2AG, AR8s AB AR, C9AA, EK1s AQ MD, ET9X, FK8SAA, LX1s AS DC JW, MI3s AB VG, MP4AMO, PJ5OK, PKs 4OO 5AA, ST2RD, VK1s MD PG RF YG, VSs 2CP 7NG, YI3s BZL ECU and Marion Island's ZS2MI . . . . . Phone on 14 Mc. is the mode for EAØAC, EQ3FM, HZ1AB, VQ6BFQ and VR1C . . . . . The toppers on 28-Mc. voice are MD2PJ, VR1E, W5OEU/KW6, ZSs 7C and 9F . . . . . "Tidbits" discloses that AC4RF is under political arrest. Also that plans are afoot to accelerate DX activity in Andorra, Guadeloupe, Monaco, Seychelles, Svalbard and Zanzibar . . . . . Jeeves enthusiastically confuses TVI effects with causes, and there are portraits of prominent British DX men Gs 2MI 5FA 5LI and 6ZO as contributed by roving cameraman W2AIS.



A crowd-pleasing exhibit at famed Waseda University, Tokyo, was the amateur station set up and operated by JA1s CMN CON CDY (left to right) and others during the school's annual festival in November. Ex-KN3IJP, on the scene to make this picture, commends the JA gang's effusive hospitality.



Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

THANK YOU, BUD!

¶ It is with deep regret that I see the ARRL must end 1960 with the loss of A. L. Budlong, W1BUD, from its staff. Although I have never worked Bud on the air, nor do I know him personally, evidence of his labors are evident in practically every day of my hamming, and activities as an Official Observer.

I want to make this my personal letter of thanks to Bud for his devotion to the greatest hobby in the world. There may be a man who can fill his chair on the ARRL staff, but he can never be replaced. Let us hope that Bud can fill his hours of retirement enjoying the fruits of his work on the air.

My best wishes to "Onehellofaswellguy," Bud, W1BUD. —*Gary B. Huff, K9AUB, Carlinville, Illinois.*

(*Editor's Note:* The sentiments expressed in OM Huff's note are typical of several hundred letters received at Hq. which were bound into a book and presented to W1BUD.)

PLAY IT SAFE

¶ This letter is to tell of an accident, Christmas night, which came very close to being fatal. I had received a new transmitter to replace my old one. When I got home it was about 9:15 P.M. I was very anxious to get on the air, as can be expected. I turned on my equipment and reached up to turn on the lamp above my equipment. As I was doing this I grasped the microphone with my other hand. The lamp had a short in it due to some of my faulty wiring and I received a 110-volt shock. Luckily, the lamp was sitting on a ledge and due to the weight of my hand the lamp fell breaking the short . . . — *Bruce F. Calkin, WA2KWG, Wyckoff, N. J.*

¶ It is after near-calamity that I write this letter. The other day, after coming home from bowling, I returned to a burning operating desk, and a smoke-filled room. The cause, — one electronic keyer, made by a very reputable manufacturer. It seems that a capacitor exploded, taking the rectifiers and power supply transformer with it. The keyer *was not fused.* Thinking about this for some time, and realizing how close disaster had come to my home and my parents, I was shocked to realize how many receivers and other electronic gear, not in the transmitter class, are not fused. Remember! A receiver may be only drawing a small amount of current while it is running properly, but a receiver malfunctioning can and will draw more current than a transmitter.

Don't rely on house fuses. A house fuse will usually take fifteen amperes; the malfunctioning apparatus may be only drawing ten amperes, but that is more than enough to start a blaze, as I have sadly learned. Any equipment, no matter how small, which relies on an a.c. power supply, should be fused! — *Gary M. Levin, K1CCA, Springdale, Conn.*

"RESPOS"

¶ A group of exceptionally courageous people, victims of respiratory polio, and in many cases hopelessly incapacitated, call themselves "Respos," and have banded together through their own efforts as well as the efforts of a few unselfish and wonderful people who are unafflicted.

A few of them are interested in amateur radio, and actually are operating at the present time. They would like to organize a group of "Respo" hams; perhaps if enough interest could be developed a "Respo Net" could be started.

To help to get this project started, I suggest that all interested ham "Respos" send me as much detail about their stations as possible. This could include:

Name, address and call letters.

Type of equipment used, and whether c.w., a.m. or s.s.b.

Bands or frequencies which can be worked.

Time available for working ham radio — that is, what days and what times of the day can be used.

I shall correlate this information and then contact each one by mail, telling them how they can contact me on the air . . . *Joel C. Carpenter, W8RYR, 32 Walnut St., Chagrin Falls, Ohio.*

STRONG SUPPORTER

¶ On the occasion of the 45th year of *QST*, and my umpteenth renewal of my League membership and subscription to *QST*, I wish to pass along my felicitations for the good work you are doing in West Hartford. I am not the most active ham in Cumberland County, Maine, but I sure am among the most ardent. I feel very strongly that the ARRL is doing excellent work, and I strongly urge you to continue your forward motion.

Tremendous strides have been made over the span of my own ham activity, and the place of amateur radio in our scheme of things seems ever more secure. Yet, some of the things I hear on the bands distress me, and I feel that now, more than ever, is a time for strong leadership and good planning if this activity is to continue to keep its values. — *Arthur Owens, W1ECM, Scarborough, Maine.*

CW/M

¶ I think c.w. is tops and it has its place but mobile c.w. (Dec. *QST*) is carrying it a bit far. You have heard people arguing how dangerous "one arm driving" is, but c.w./m — well! As an 18-year-old student I can't really speak from experience, but can you fellows honestly say that you do not need both hands on the wheel and complete thought in your driving? With Katashi doing 70 m.p.h., mobile c.w., you can bet I will stay out of the road! — *Keith Lamonica, WA6CYT, APO, New York, New York.*

SELECTIVE CQ'S

¶ Since I received my General license in October I have operated mostly 75-meter phone. To my amazement I very frequently hear a particular amateur calling "CQ, no WAs, no s.s.b., Class-A operators only, no phonetics," etc.

This same amateur has another side hobby of seeing how many amateur licenses he can help to have suspended with his cute way of taping every minor mistake his fellow amateurs make on the air. In my opinion this person should not even be allowed the privilege to operate a station. — *Chuck Hummel, WA3LTX, Binghamton, New York.*

IN A RUT?

¶ After operating c.w. and a.m. phone and mobile c.w. and a.m. phone for twenty-six years, I have come to a conclusion: a rather large percentage of all my QSOs have been of a stereotyped and routine nature.

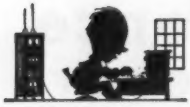
As a 95% c.w. man, I am forced to admit that this conclusion was reached after having a few QSOs on s.s.b. phone, where I found that because of the VOX provision built into the equipment used by a very high percentage of the s.s.b. stations, the QSOs were definitely non-routine. It appeared to me, in fact, that a sort of compulsory break-in operation prevailed and that once the operator became accustomed to it, he used the system quite efficiently.

Tell me that I'm wrong, that our c.w. and a.m. QSOs are not routine, and that you, as an operator, really know something about the fellow with whom you have had a QSO or two! In short, pat me on the head and tell me I shouldn't have these negative thoughts. — *S. T. McNeal, W6LDJ, Santa Ana, California.*

SOLD!

¶ Thought you might be interested in knowing how I made out with my Ham-ad, which was in Dec. *QST*.

(*Continued on page 132*)



Operating News



F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, W1DGL, Ass't. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

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A year ago in this column we noted the steady gains in popularity in keeping FCC logs in 24-hour time (0000 to 2400). We concluded a discussion on Voluntary Use of GMT: "In DXing everybody who gets any place uses Greenwich Time . . . To be understood internationally, reference to a single time meridian is the ultimate in good sense."

We hardly foresaw that our League's Board of Directors would at the May meeting unanimously recommend Greenwich Mean Time — or that it would be acclaimed by officials and appointees, or get well nigh unanimous use in the popular November Sweepstakes. For those amateurs just getting in the swing of using GMT we have a major article coming up next month. Operating News of August '60 *QST* devoted some space especially to discussion of GMT and why we should use it. This was followed up in November *QST* by explaining the letter system for designating Greenwich and other time zones. The subject in our January '61 issue was confined to a reminder about dates in GMT logging. Enough has been said so that anyone interested should find it easy to start radio use of Greenwich Time. Our question posed this month is "Can we now help further?"

Putting one's station clock on GMT is one of the most convenient ways to get the shack in step with the times and make direct logging a cinch. We've been thinking of those that might be helped by a conversion chart showing Greenwich and each of our major time zones, patterned somewhat after the chart we gave in August *QST* in these pages. If you think an ARRL Operating Aid card would be useful, send us an amateur radiogram or a postal card saying so, and we'll see what can be done in that direction.

On Improving Operating Practices. The SCM of Oregon, W7JDX, reports that a number of operators have the bad habit of leaving off the W when giving their calls on the air. This is especially true on v.h.f., he says. FCC cites amateurs frequently for this one. There is no substitute for the full call as *required* at the beginning and end of communications. In the course of a QSO, references to nicknames or parts of a call may be admissible but not for the official signing of your station. See that your FCC-required identifying call *including* prefix and numeral is given correctly and completely. Almost weekly this and other examples of poor operating appear in our mail. We'll therefore make the New Year an excuse for selecting one or two points to mention in each of several operating fields. Probably we're all guilty at times of general faults such as careless transmitting without first checking a frequency to see that it is clear. Other difficulties apply just to certain groups.

In the DX field there's nothing quite so futile as "transmitting blind." Have you heard amateurs calling a DX station, when this station is already calling CQ or a specific station? We guess such calls have to be from wishful or neophyte DXers of the type that have heard someone else call a station but not located the station itself! The chances of success are negligible. Let's have none of it. Also according to our correspondence, superposing calls on somebody else's transmission is *not* universally the popular thing to do. Operators in DX countries can discourage this by selecting stations that show proper courtesy and behavior to call and work. $\overline{\text{KN}}$, "Go ahead specific station, others keep out," is a positive ARRL recommendation that, we think, should be more universally used. At the end of any transmission it indicates that calls from stations other than indicated in the call are not desired and will not be answered. Strict observance of the injunction by all other than the station addressed will do much to permit 100 per cent contacts to be completed so there will be more time for other stations (including yourself) to be worked. For this and other DX points, ask for ARRL Operating Aid No. 5, the DX Operating Code.

Spread out can be excellent operating advice to improve the chance of making contact, both for h.f. DXers and the v.h.f. worker. We appeal to DXers across the sea to make greater use of U and D, such as "1ØU" to mean "call *ten* kc. *up* from my frequency." One must follow through,

and never violate the instruction he has given by answering calls that are close to one's own frequency. The meaning only works as well as your faithful living up to your statements!

Novice Goals. In an issue of its Club Bulletin the *Bayonne Amateur Radio Club* sets forth some possible reasons why some Novices (or TN's too) fail to make their General Class. It is indeed to be deplored when newcomers fall short of goals and thus never come to realize the full measure of DX and traffic work and country-wide hamming that is within reach. Here's what the BARC has to say on the subject.

"An amateur's goal *should* be a General Class license. The Novice must have some ham interest or he would not have studied at all. He invests in a station. If he fails his equipment is of no value. Most learn enough theory to pass. Some fail because unable to reach the required 13 w.p.m. As soon as many Novices get tickets they grab a mike . . . imbued with the idea that a year is a long time to get the code speed up there. But the longer one waits the less chance he has to become a General Class licensee.

". . . When a Novice joins a club he should not be permitted to operate any phone equipment in the Novice bands. Every organization that encourages this operation on voice is doing the Novice an injustice, contributing to his possible failure. A Novice should build his code speed to at least 15 w.p.m. to insure a little leeway when taking the exam, limiting the man's chance to be a real and full amateur . . . FCC might well require Novices to operate on c.w. — only for the one year license and then every Novice would probably become General Class. At any rate, Novices would do well to take heed and stay on c.w. for one year, or at least until code speed permits passing the General Class exam. Each Novice should work c.w. only, if *really* out for that ticket. He should have one thought in mind constantly: GET GENERAL CLASS BEFORE ALL ELSE." — W2GKE.

DX Test (2nd Period): Phone Mar. 3–5, C.W. Mar. 17–19.

How did you find the DX in the February sessions of the 27th ARRL International DX Competition? We hope it was never better! Both to give you a chance to pick up some missing countries and multipliers, and to help surmount or circumvent any unfavorable propagation conditions, this '61 DX Contest in the usual pattern provides second phone and c.w. periods in March. Full DX Test rules appeared in January *QST*, if you need to review them or are starting new at this time. In case you had an equipment disaster, or got sent away on a business trip or had other complications and couldn't make it in February, here is *another chance*. Try to work some new DX, or renew contacts with some of the DXers you have worked in past years in this current fray. It's a test of what your station can do with DX, and if you're well up the list you can listen a lot and wait out the rare ones. We hope you find new fun, new stations, and can roll up a good score for your ARRL, Section — or your country, in case you are the DX! Send in your score to ARRL, please, as soon as the fracas is over. We'll need it to give you the credit due you, and small scores as well as large are needed to make complete crosschecking possible. Once again, luck and DX.

— *F. E. H.*

BRIEFS

Concerning the September VHF QSO Party, as reported in December *QST*, K9LBQ was incorrectly listed under the Illinois Section. His 424 points leads the Wisconsin Section for the contest, gaining him the Section Award.

—•••—

Regarding the Field Day results as reported in December *QST*, the top four-transmitter class score was submitted by W2OYH/2, the Morris Radio club. Their corrected score should read 1551-A-30-14,283, *FB!*



RACES has a decal. So has MARS. It's about time the AREC has one too, so here it is. A black-and-white portrayal doesn't really do it justice, but it does give you an idea of the design. The design is by W1JMY, assistant circulation manager of *QST* who also had a hand in designing the RACES emblem.



The AREC decal is in traditional ARRL colors, gold on black background, similar to the ARRL emblem itself. In black-and-white portrayal, of course, this comes out white on black. It is intended for use on AREC equipment and mobiles, and although there is no charge for it, you don't get it just for the asking. You get it from your EC *only*, for signing up in the AREC and/or being active therein. ECs have strict orders *not* to take these decals to club meetings, hamfest or conventions and leave them where all can help themselves. They are given out only when they'll be used and when their use means something.

We visualize the AREC decal and the ARRL decal (10¢) appearing together, maybe along with a RACES decal, on cars equipped with mobile amateur radio equipment.

The design of this decal is now the official AREC emblem. Some time back, members of the Cuyahoga County (Ohio) AREC group got us started on this by submitting a number of suggestions and drawings. We don't recall what got *them* started on it, but in passing their suggestions around and discussing the matter among a number of staff members, we eventually devised a set of maxims for such an emblem: (1) It should contain the letters AREC prominently. (2) It should include the words for which AREC stands. (3) It should indicate ARRL's sponsorship. And (4) it should symbolize communication — if possible, emergency communication in the public service. All of the Cleveland group's suggestions met one or two of these maxims, but none of them covered all. So we started doodling. By the time the above was adopted, we had dozens of ideas, something wrong with each one. Well, to make a long story short (you can't please everyone), the design finally adopted had the biggest majority approval. We hope you like it.

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Fellows, do the surrounding pages seem to you strikingly devoid of illustrative material? They do? Well, then, how the dagnab about sending in something we can use to decorate them with? Pictures are always welcome. Anybody have any good cartoon ideas? If so, let us have them and we'll see about having Gil draw them up.

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In the list of amateurs participating in the South Dakota storm emergency (Feb. *QST*, p. 77), we note that after the list of *KØs*, we start off with *more KØs*. This is an error; the

NEW NET DIRECTORY AVAILABLE

The annual cross-indexed net directory is late this year, but it will certainly be available long before this appears in print. If it isn't, we'll eat copy, stencils and all. By now, the requests on hand will have been filled and we'll be ready for additional requests.

There is no automatic mailing of the net directory. It's too bulky and expensive to throw copies away. Copies are sent upon request only. The directory is arranged alphabetically by name of net, alphabetically by name of nets within states or VE provinces, and by frequency from low to high. Information on each net includes operating frequency, days, time (both local and GMT), call of net manager, purpose, approximate duration, net designation and coverage — where this information is supplied by the registrant, of course.

If you want a copy, you may have it for the asking from the ARRL Communications Department.

second series of calls are *WØs*. Also, WØSCT owns up to two errors in the list: the first call listed should be KØAIE, not KØQIE, and in the second group of calls DFC should be KFC.

Then, along comes WA2DAC to tell us that he left W3BWF/2 out of the list of amateurs participating in the B-52 crash search (same page, next column).

So who's perfect?

— • • • —

On Nov. 11 two men were overcome by gas at a resort cabin in Newberry, Mich. K8PNA, the wife of the resort owner, contacted K8KIT, who notified state police and aid was immediately summoned. No other means of communication was available. Cooperation on 3920 kc. was something to be proud of." — *K8KIT.*

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On Nov. 24 a serious flood condition in Southern Oregon disrupted telephone communication at the Medford airport. EC K7JQS was asked to supply communications for the Weather Bureau to outside points. A group of amateurs were alerted and for three days performed the necessary service, until telephone communication was restored. Other amateurs who served: *K7s* HOZ HBA IQS, *W7s* VIL IGW OQL QFK VOR WHY MCY. — *W7JDX, SCM Oregon.*

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On Dec. 3 a group of AREC members in the Portland, Ore., area, provided communication in a search for the body of a murdered woman. Net control was W7PXX, others including *K7s* BKS CSI IMH GJQ, *W7s* TIB WHN. — *W7JDX, SCM Oregon.*

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On the evening of Dec. 8, freezing rain started descending in the area around Roswell, N. M. After the ice coating had taken care of most communications facilities, from 12 to 18 inches of snow were dumped, snarling up transportation as well. On the morning of Dec. 9, K5IQL was asked to try to get weather reports for a local broadcast station. By 0700 the regular Friday session of the Breakfast Club Net was in action, with W5WPA as NCS. He remained on the air the entire day while more than 100 stations checked in to handle emergency traffic. W5VX took over at night, while powerful stations in Oklahoma and Louisiana protected the frequency (3838 kc.). All sorts of emergency, welfare and routine traffic was handled for the state highway department, news services and Western Union. The town of Tatum was completely without power, and consequently without water; K5QCP, in nearby Lovington, arranged for the dispatch of emergency pumping equipment. The team of K5CDL and K5CDM represented Truth or Consequences from their chilly basement, where marooned truck drivers were able to get word to their headquarters and relatives. El Paso and Albuquerque were the destination points for much of the traffic, and these cities were well represented, with K5ZPS in El Paso doing a lion's share of the work. Others mentioned for outstanding work are W5MYM and K5ZWI. Most of the intra-state traffic was handled on 3838 kc., while traffic to and from out-of-state points went to the higher bands. A creditable performance by New Mexico and Texas amateurs in a real emergency. — *K5IQL, SCM New Mexico and K5VLH, EC Sierra County, N. M.*

You probably remember reading about the DC-8 that crashed in Brooklyn, N. Y. on Dec. 16, after colliding in mid-air with a TWA Constallation. RACES units were ordered to man their stations and wait for orders, and at 1130 W2VYE arrived with his radio-equipped car at the edge of the disaster and waited for an opportunity to be of service. At noon, Kings County EC K2OVN arrived at borough control and activated the two and ten meter nets. Red Cross Station K2QDB requested communication with the field workers at the scene of the disaster, so W2VYE moved in and provided this service in a highly efficient manner.

Operators at the control station were K2s DBM OVN SHF, WA2s FMF IMM. Active on the two meter net were *K2s* QQH/2 OHH/2 UAG DNY, W2LDC (2-meter EC) and WA2GAB. Operating the Red Cross Station K2QDB were *K2s* QAI JFL, W2BN. By 1600 telephone lines had been installed and all units were released. — *K2OVN, EC Kings County, N. Y.*

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On Dec. 11, AREC members of the Huntsville (Ala.) Amateur Radio Club participated in a Christmas charity drive. Base stations were established on 75 and 6 meters at the local c.d. office and mobile units were dispatched to all sections of the city from this location. In the afternoon the local TV station donated a spot to the amateurs during which the public was given an idea of what was going on, W4NIQ/mobile was shown receiving a dispatching call from the c.d. office and K4GTQ made an appeal to the public to "keep donating." Sixteen amateurs took part. — *K4AOZ, SCM Alabama.*

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Michigan SCM W8FX sends us a copy of the year-end report submitted to him by EC W8ELR of Oakland County. In turn, we thought you might like to see what a good EC does during the year to keep his group on its toes. Howard lists twelve special activities, in addition to regular scheduled weekly nets on 10, 6 and 2 meters. Total amateur participation in the 147 activities during the year was 1744 "sorties" (we assume a "sortie," in this case, is one amateur participating in one activity). Some of the special activities included a motorcycle race, a banquet, election night news coverage, AREC-sponsored programs to county clubs and high schools, an AREC county directory, preparation and distribution of four major articles for newspapers, broadcast station publicity, technical advice and assistance to AREC members, distribution of several hundred copies of the booklet "Noise Reduction for Mobiles," continued work on production of an AREC movie, building and installation of AREC RTTY stations, and building of a portable "demonstrator" RTTY station along with a film strip and synchronized tape for demonstrating both to amateur groups and the general public. We take off our hats to you, Howard. That's *quite* a program!

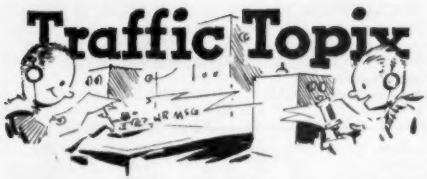
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November reports were received from 31 SECs, representing 12,538 AREC members, a substantial increase in both respects over the same month in 1959. SECs reporting: Ont., Mich., Maritime, Santa Clara Valley, E. Pa., N. N. J., Md.-Del.-D. C., Wis., Okla., La., Minn., Iowa, S. Dak., N. Texas, E. Fla., Colo., Utah, Nevada, Ore., Wash., San Joaquin Valley, E. Bay, Kans., Maine, N Y C-L I, Ohio, E. Mass., S. Texas, Ga., San Diego, Indiana. Incidentally, San Diego adds another to the total sections heard from in 1959, making it now 42!

RACES News

Amateurs of the Champlain Valley AREC and Clinton County, N. Y., RACES combined for participation in civil defense Operation "Go Home" at Peru, N. Y., on Dec. 7. Champlain Valley AREC and Clinton County RACES are identical units under two different names. This time they operated as RACES. The alert sounded at 1425, and within five minutes all schools in the area had been contacted through RACES facilities. Twenty amateurs took part using their RACES identification (units of W2OZY) and relayed information on the progress of the evacuation back to the control station. Twenty-three messages were passed in regular c.d. form. — *WA2DAC, Asst. RO, Clinton County, N. Y.*

Traffic Topix



Some of us traffic men take quite a lot upon ourselves. Recently, we received a letter telling us that a traffic man notified an originator of cancellation of a message because he "failed to see any reason why he should mail a message of such content."

Well, we can think of one very good reason — that he accepted the message and receipted for it and thereby assumed responsibility for its delivery or relay. The fact that he at least informed the originating station that he was cancelling it is in his favor; but the fact that he did cancel it after having accepted it, thereby making it impossible for *anyone* to deliver it (could be others aren't quite so fussy, you know) indicated that this traffic man not only refused to deliver it himself, but by cancelling it took it upon himself to judge that it should not be handled *at all*.

We have been over this before, but let's have another go at it. First of all, we have scant sympathy for operators, stations or nets which read the texts of messages received (which are none of their business) and pass judgment on whether they are important enough to handle. Our job is to *copy* the message, not read it and interpret it. However, this is still a free country and no amateur has to handle a message he doesn't want for whatever screwy reason — even personal dislike for the originator. It's kind of a dirty trick, though, to let another station send you the whole thing, then tell him you won't accept it; almost as dirty as peremptorily cancelling the message because in your judgment it's not important enough. If you're going to be choosy, better make sure the message suits your fastidious taste before you agree to handle it — that is, make sure it's not too long, too unimportant, too old, too commercial-sounding, too garbled, that it has a complete address, and that it doesn't say anything you disagree with or don't understand.

Secondly, we'll admit that sometimes a lot of "junk" traffic is thrown on our nets and we don't like it any better than you do, personally. We all like to think we're doing something that's worth doing, and the perpetrators of such outrages are not doing the amateur traffic-handling game any good. We can remonstrate with them, but once the traffic has been originated we're stuck with it. Besides, it's usually less trouble to relay it, or even spend three cents to mail it, than to write the originating station a nasty letter or send him a nasty message.

Thirdly, statistics show that the amount of traffic being handled is showing a slight decline year by year, although the number of traffic men is on the increase. Thus, we all have a responsibility to originate traffic; but let's make it good traffic, not the kind of stuff that makes us feel that we are being played for a bunch of suckers.

—•••—

Net reports (December):

Net	*Sessions*	*Check-ins*	*Traffic*
Dixie Early Bird	29	579	329
75 Meter Interstate Sideband	31	1265	1575
7290 Traffic	45	1851	1146
N. E. Area Barnyard	27	757	19
Eastern Area Slow	31	234	143
Early Bird Transcon	30	...	1284
Teenage Fone	10	...	37

—•••—

National Traffic System. Warning! Bad conditions ahead. NTS nets in December, when the traffic was heavy, got their first real taste of operating under unfavorable propagation conditions. We're glad to note that most of them rose to the challenge and, generally speaking, NTS nets did well. Of course, this is only the beginning. Conditions will vary from day to day, but the general trend will be downward. Skip will be long at night, comparatively short during the daylight hours. Twenty meters and below will do a complete fadeout after dark. Forty meters may do likewise at times. Early section nets on 80 may operate successfully, but late ones will surely be washed out (unless they shift to 160 meters), and region and area nets will have their troubles and many QNB's will be necessitated.

The solution? Well, there is none, really, unless we shift to 160 meters. Many faint-of-heart will fall by the wayside. We'll try the same things we tried in the last "low cycle," such as try to organize on 6 meters for some of the smaller sections, start a morning section net, juggle times and schedules. But, all in all, conditions like the ones coming on are as inevitable as the winter snows (quiet, you guys down south!). All we can do is our best, and that we will do, just as we did the last time.

December reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	112	1866	.475	16.7	70.3
2RN	62	1212	.869	19.6	97.7
3RN	62	1201	.404	19.4	97.3
4RN	62	1359	.571	21.9	92.3
RN5	62	1833	.674	29.5	91.7
RN6	19	364	.398	19.1	70.5
RN7	57	865	.368	15.2	38.4
8RN	61	774	.315	12.7	91.8
9RN	52	1724	.947	33.3	83.2
TEN	92	1912	.752	21.2	63.9
ECN	21	116	.258	5.5	74.6[1]
TWN	42	869	.551	20.7	85.7
EAN	29	2274	1.377	78.4	97.7
CAN	31	2858	1.387	92.2	100.0
PAN	30	2613	1.201	87.1	98.9
Sections[2]	1098	11858		12.1	
TCC Eastern	102[3]	1383			
TCC Central	93[3]	2511			
TCC Pacific	121[3]	1760			
Summary	1892	39353	CAN	17.8	CAN
Record	2045	44109	1.380	23.5	100.0

[1] Region net representation based on one session per night. Others are based on two or more.

[2] Section nets reporting: AENP, AENP Morn, AENO, AENB & AENT (Ala.); QKS (Kans.); W. Fla. Phone; QMN (2 Mich. nets); WVN (W. Va.); BEN, WSSN, WIN (Wis.); FMTN, Gator, FPTN (Fla.); Tenn. Phone & Tenn. CW; S. Dak. CW, NJQ & S. Dak. 75 Meter Phone; NEB (Nebr.); SCN (Calif.); MDDS (Md.-Del.-D. C.); NJN (N. J.); KYN (Ky.); SCN (S. C.); ILN (Ill.); SASK (Sask.); RISPN (R. I.); NHN (N. H.); CPN & CN (Conn.); MSN, MJN, MSPN Eve & MSPN Noon (Minn.).

[3] TCC functions reported, not counted as net sessions.

Only one record broken this month: CAN crashes through with a new record rate for December. Considering the conditions we had to contend with, the nets did very well.

The 1RN CW sessions reported 61 sessions, 1623 traffic total, .836 rate, 26.6 average, 77.77% representation. 1RN phone sessions reported 51 sessions, 243 traffic, .175 rate, 4.7 average and 63.72% representation. A "good show" on 2RN, which exceeded totals for last December. W3UE reports slightly less traffic but much stronger organization on 3RN compared with last year. Tennessee was the only section with 100% representation on 4RN. RN5 certificates have been issued to *K5s* JFP MVI USE DUJ and W5LR; W5CEZ is assistant net manager and



Incoming SCM K2MFF (left) gets some information on what he's in for from outgoing SCM W2ZVW at the Annual Confab of the New Jersey net on Nov. 5.

esprit de corps is of the highest. Many net reports were missing on RN6. A new Saskatchewan CW Net is now reporting into RN7; W7QLH says that bad conditions accounted for five washed-out sessions. W8DAE reports that 8RN shows steady improvement, with increased attendance and higher traffic totals. W9DO reported the 9RN data in the absence of W9ZYK on mid-winter vacation. TEN certificates have been awarded to *KØs* MR8 QFK UKU MAU IVQ DVW, *WØs* I8J PET DUA BYV; Iowa and Minn. are the topnotchers, but Manager WØLCX is making an effort to step up representation of other sections. With longer skip, ECN is getting better representation from the Maritimes, but more QRM from other nets. KØEDH is bowing out of the TWN managership after a very successful term; the Pacific Area Staff will recommend a new manager. W9DYG has done an excellent job keeping things going according to plan on CAN, under somewhat difficult circumstances; he even turned down a chance to become Wisconsin SCM. It's no picnic running an area net spread out like PAN, but KØEDK reports things going well with an excellent staff.

Transcontinental Corps. Station B (Eastern to Pacific) is having a high percentage of failures as twenty meters goes to bed early. Most of the TCC stations make extra schedules when traffic is heavy and cannot be handled in time available.

December reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	102	88.2	2174	1383
Central	93	92.5	5222	2511
Pacific	121	81.0	3499	1760
Summary	316	86.7	10895	5654

The TCC roster: Eastern Area (W1SMU, Mgr.) — *W1s* AW EMG NJM OBR SMU WEF, W*A8s* APY COO, *K2s* S8X UFT UYW, W3WG, *W4s*, DVT PNM, W8UPH, VE2AZI, VE3CWA. Central Area (WØBDR, Mgr.) — K4AKP, *WØs* CXY DO DYG ZYK, *WØs* LCX BDR SCA. Pacific Area (W6EOT, Mgr.) — W5ZHN, *K6s* ZYZ GID DYX, *W6s* EOT ELQ HC WPF QMO, *WA6s* OAQ ATB HZM GKK, K7NWP, *W7s* GMC ZB HH DZX, *WØs* WME KQD FEO, *KØs* EDH EDK CLS/6.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for December Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	501	5944	4822	1034	12301
WØLGG	556	1470	1432	54	3512
K6LVR	22	1775	1697	8	3502
W7BA	7	1461	1397	63	2928
WØLCX	76	1256	1114	149	2595
WØSCA	26	1242	1237	3	2508
WØBDR	104	1157	1012	2	2275
K4AKP	103	1062	987	70	2222
W9IDA	69	989	982	3	2043
KØORK	70	989	898	84	2041
K4SJH	196	969	787	61	2013
K6BPI	121	933	715	218	1987
W9DYG	173	776	675	43	1667
W8UPH	34	812	669	134	1649
VE2AZI/W1	16	797	762	24	1599
K2UTV	120	720	600	118	1558
W3VR	71	769	697	15	1552
W7DZX	12	735	670	62	1479
WØOHJ	24	711	711	11	1457
W3EML	25	678	623	54	1380
WØTUS	26	527	708	73	1334
KØONK	115	566	604	18	1303
K2UAT	353	488	363	88	1292
W8DAE	52	639	425	145	1261
W3IVS	10	337	870	42	1259
KØHGI	184	528	325	203	1240
W7PGY	27	603	553	46	1229
W9DQ	22	587	573	36	1218
W6GYH	266	474	455	22	1217
W4PL	14	577	524	13	1128
K1CIF	687	228	143	52	1110
K6EPT	10	539	284	255	1088
W6WPF	160	460	432	28	1080
W9JOZ	8	522	529	1	1060
K1ITS	15	521	507	0	1043
K2UBG	531	272	114	110	1027
W1SMU	57	496	433	21	1007
K5OEA/1	17	492	478	14	1001
K3GSU	1	777	190	14	982
W4OGG	9	472	450	18	949
K5WI	85	406	368	32	891
W9CXY	17	433	414	9	873
WA6OAQ	27	409	404	11	851
K9BTE	29	411	410	1	851
K4EHY	35	409	379	26	849
K3HWX	44	400	360	40	844
K1GNR	36	402	361	41	840
K3HWP	43	390	350	40	823
K3HWL	304	251	236	15	806
W6SYQ	8	395	393	2	798
KØWWD	226	284	181	103	794
K5MVI	103	348	314	24	789
W7ZB	6	389	359	26	780
W7HUT	2	383	372	11	768
W2MTA/9	61	355	318	27	761
W9TT	22	356	215	146	739
W2EW	195	278	112	151	736
K2UFT	17	369	315	26	727
W2RUF	30	375	189	126	720
W8SCT	34	351	325	10	720
K9QAE	33	344	274	66	717
W2EZB	7	342	287	76	712
WA2GPT	27	334	67	258	686
KØEDH	19	321	316	9	665
VE3CWA	166	264	191	34	655
WØZWL	3	451	10	190	654
KØEDK	20	332	289	5	646
K4PGH	158	260	224	2	644
K4ZXX	5	320	312	3	640
K1LLX	1	319	311	8	639
WØDUA	18	303	314	2	637
W3WRE	51	292	284	8	635
W2OE	122	269	186	53	630
KØCLS/6	29	316	276	9	630
K5CAY	17	305	285	14	621
K2RBW	369	131	110	9	619
WA6CDD	170	223	203	18	614
K6OZJ	5	301	291	10	607
K7HIL	5	292	274	18	589
W5ZYL	77	218	264	29	588
W1EMG	22	291	230	43	586
K6ZCR	55	252	175	99	581
K4KWQ	38	295	152	90	575
W0WME	23	275	269	5	572
W9IMN	20	280	72	199	571
K8SPD/1	7	276	284	2	569
K1AQE	34	265	182	83	564
WA2FBC	13	274	252	22	561
W9VAY	77	264	211	6	558
WA2GQZ	21	268	239	26	554
K4UBR	155	193	160	43	551
W3ZHN	58	257	131	105	551
W2APF	105	220	0	220	545
K2UYW	20	265	242	5	532
K9CVJ/4	32	234	195	71	532
W6NBX	16	294	136	83	529
W9PZO	14	259	204	52	529
K9UGV	33	240	229	25	527
K7NWP	1	263	250	9	523
K6DYX	2	247	269	3	521
W3MFB	51	239	126	103	519
K2UCY	24	247	231	16	518
K7KBK	10	253	245	9	517
W0ISJ	89	224	182	16	515
WA2CIG	1	256	236	20	513
K4CNY	94	207	189	16	506
W0FEO	42	242	151	71	506
W1TXL	74	213	158	55	500

More-Than-One-Operator Stations

W6YDK	3276	118	373	491	4258
W6IAB	70	2030	1988	42	4130
K6MCA	135	1033	995	19	2182
W6ZJB	379	626	576	26	1607

BPL for 100 or more *originations-plus-deliveries*

W4J8J/4	268	W1TWG	135	WA6INR	108
K4COO	256	W1FHP	133	W7GYF	108
K7BKH	248	W3KUN	133	W0LJW	108
K4AMC	234	K3JYZ	127	W0QDL	108
W9DGA	215	VE2WT	126	K1LQD	107
W9GJS	207	W1HJG	124	W6DEF	107
W4MYA	202	K3KPZ	123	KØRRL	107
K4DOR/VDU	200	K1LNA	122	K4FNR	106
K3GMV	196	K9CIL	122	K9GDF	105
K2DEI	175	W4EAT	122	KP4AOD	104
K3HRN	171	KØBXF	121	K2VVL	102
WA2CCF	164	W6BHG	120	W7OCX	102
K8KMQ	155	WA2BNF	117	K9OKD	102
K3WBJ	151	W4BAZ	117	K3CRU	101
W8EU	144	K4FSS	117	K3IPK	101
WA2EJZ	143	W8BZX	117	W8ZYU	100
K6DCW	141	W8RTN	114	KØAUU	100
K1PF8	136	K3GHH	113	Late Report:	
K9IVG	136	K3KDP	110	K4BRP (Nov.)	202

More-Than-One-Operator Stations

KZ5JW	194	W1AW	115

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: K2UAT, K4PGH, WØOMM.

The BPL is open to all amateurs in the United States, Canada, Cuba and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard ARRL form.

NATIONAL RTTY CALLING AND WORKING FREQUENCY

3620 kc. 7140 kc.

RTTY NOTES

Results of the RTTY Sweepstakes of November 5 and 6 have been received from W6AEE of the RTTY Society of Southern California. A total of 117 logs were submitted with the top twelve scores shown below:

W2RUI	8496	WØGK	4480
W6YJG	8140	KH6IJ	4480
W8JIN	7210	W2TKO	4448
W2JAV	6666	W7FEN	3942
W7ESN	5841	W7PHG	3538
WØTBL	5930	W8CAT	3537

—...—

Sorry to say we received the dates of the 8th Anniversary RTTY SS Contest (Feb. 24–26) too late for inclusion in February *QST*.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Mar. 20 at 2130 Eastern Standard Time (0230 GMT, Mar. 21). Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6OWP only will be transmitted Mar. 2 at 2100 PST (0500 GMT, Mar. 3 on 3590 and 7129 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST (0230 GMT). Approximately 10 minutes' practice is given at each speed. Reference to tests used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text sometimes is reversed. To improve your fist, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date	Subject of Practice Text from January *QST*
Mar. 3:	*A Parametric Amplifier for 1296 Mc.*, p. 13
Mar. 7:	*"Bud" Retires*, p. 11
Mar. 10:	*Not Just a Novelty*, p. 22
Mar. 16:	*Timing . . . Change-Over System*, p. 40
Mar. 20:	*A 4-400A Amplifier . . .* , p. 33
Mar. 23:	*That Professional Touch*, p. 65
Mar. 30:	*A Dead Art?*, p. 55

HIGH SPEED CODE TEST

The regular semi-annual high speed code test, sponsored by the Connecticut Wireless Assn., Inc., is scheduled for Monday, Mar. 20, at 0130 GMT (Sunday, Mar. 19 in all U. S. and Canadian local time zones). W1NJM will transmit simultaneously on 3637 and 7120 kc., W6EOT will transmit synchronously on 7005 kc., and we are hoping to get one or two additional stations to join in. The text will consist of five minutes of plain language at speeds of 40, 45, 50, 55 and 60 w.p.m. beginning at 0145, 0155, 0205, 0215 and 0225 respectively. All transmitting stations will hit the air at 0100 for a half-hour call-up. Instructions start at 0130. To qualify at any speed, you have to copy one minute or more solid out of the five minute transmission. Copy goes to W1NJM.

Speeds will be as accurate as possible, within the limits of equipment available, but they may not be right on the nose. It is best, therefore, to copy all you can of each transmission, marking the part you think is a minute or more solid at your best speed.

Practice at speeds of 15 through 65 w.p.m. continues each Monday at 0130 GMT over W1NJM 3637/7120 kc. Get some practice, so you can be at your best on Mar. 20.

This is *not* a part of the ARRL Code Proficiency program.

W1AW OPERATING SCHEDULE

(All times are in Greenwich Mean Time — GMT)*

W1AW is now on its Fall-Winter operating schedule. General operation covers all amateur bands on which W1AW has equipment. Novice periods include operation on 3.5, 7 and 21 Mc. (see footnote 2 in box, page 88, Nov. *QST*). Printed master schedules showing complete W1AW operation will be sent to anyone on request.

Operating-Visiting Hours:

Monday thru Friday: 2000–0800 (following day).

Sunday: 0000–0730 and 2000–0330 (Mon.).

Exception: W1AW will be closed from 0800 Mar. 31 to 2400 Apr. 1 in observance of Good Friday.

A map showing how to get from main highways (or from Hq. office) to W1AW will be sent to amateurs advising their intention to visit the station.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

Frequencies (kc.):

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800.

Phone: 1820, 3945, 7255, 14,280,** 21,330, 29,000, 50,700, 145,800.

Frequencies may vary slightly from round figures given: they are to assist in finding the W1AW signal, not for exact calibration purposes.

Times:

Monday thru Saturday: 0100 by c.w.; 0200 by phone.

Tuesday thru Sunday: 0430 by phone; 0500 by c.w.

General Operation: Use the chart on p. 88, Nov. *QST*, for times and frequencies for W1AW general contact with any amateur.

Code Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Tuesday, Thursday and Saturday, and at 5, 7½, 10 and 13 w.p.m. on Monday, Wednesday, Friday and Sunday are made on the above-listed frequencies (except 1820 kc.). Code practice starts at 0230 each day. Approximately 10 minutes of practice is given at each speed. On Mar. 20 and Apr. 18, instead of the regular code practice, W1AW will transmit certificate qualifying runs.

*W1AW schedule is shown in GMT per recommendation of ARRL Board of Directors that use of GMT for amateur communications be encouraged. For AST subtract four hours; for EST subtract five hours; for CST subtract six hours; for MST subtract seven hours; for PST subtract eight hours; for Alaska time (central part) and Hawaii subtract ten hours. Don't forget to change the *day* (to previous day) when subtracting takes you through 0000.

**Single sideband.

BRIEF

The scores of W3DQG for the October 1960 CD Party must be disqualified due to his non-appointment status at the time of the party. The top c.w. score from Eastern Pennsylvania was that of W3GYP with 150,255 points, and the top phone score was that of W3EAN with 4410.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *phone* — 3765, 14,160, 28,250 kc.

SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listings on page 89, Nov. *QST* and page 96, Jan. *QST*. Most of these listings also represent corrections or additions in the printed net directory (see announcement elsewhere). This brings the record up to date as of Jan. 17, 1961. Nets registered subsequent to this date will be included in the final May *QST* installment.

The listing that follows is subject to the same provisions, notations and instructions as previous listings. See January *QST*, page 86, for full information.

Name of Net	*Freq.*	*GMT*	*Days*
Adams County CD Net (Nebr.) (ADCD)	29,500	0200	T
After-the-Net Net (ATNN)	3910	0100	Th
Akron O. C-D & Disaster Net[1]	50,700	2400	M
Alabama Teen Age Net (AENT)[2]	3965	2230	Dy
American Red Cross N. Y. State Amateur Radio Affiliated Mutual Aid Net	3875 50,280	1700	1/Sn
Ark. Emerg. Phone Net	3855	1200	M-S
Barry Amateur 50 Mc Net (Mich.)	50,550	0100	T
Boise Valley 2 Meter Emerg. Net (Idaho)	145,440	1430	Sn
Broward Six Meter Emerg. Net[1]	50,445	0100	T
Burlington County 6 Meter AREC Net (N. J.)	50,550	0030	T
Burlington County 10 Meter AREC Net (N. J.)	29,580	0030	F
Capital City Net (Ont.)	3540	0200	M
Carbon County (Pa.) RACES Net	145,380	0100	TF
Central Area Net (CAN)[2]	3670	0230	Dy
Champaign County C.D. Net (Ill.)	28,600 50,400 147,500	0100	S
Chicago FMN-1 AREC Net	147,500	0300	F
Chicago Six Meter RACES Net[1]	50,540	0400	F
Civil Defense of N. J. Net[1]	3505.5	1515	Sn
Colo. Emerg. Phone Net (CEFN)	3890	1500	Sn
Colo. Weather Net (CWXN)	3946	1340	M-S
Conn. Mobileers Net	145,350	0100	Dy
Eastern Area Teen Phone Net (E.T.P.N.)	3840	2100	Dy
Eastern Mass. 2 Meter Net[1] (EM2M)	145,800	0100	Dy
El Paso Ten Meter Emerg. Net	29,640	0230	T
Everett Emerg. C.D. Net (Mass.)	146,900 29,560	2400	M
Florida CW Net (QFN)[1, 2]	3650	2330	Dy
Fond du Lac 6 Meter Emerg. Net (Wis.)	50,160	0300	T
Fort Myers, Fla. Amateur Radio Club Net (FMARC)	29,000	0100	T
Freeport Amateur Radio Club Assn. Net (FARA) (N. Y.)	28,800	0300	Th
Frisco Net (Mo.)	3810	1500	S
Galveston Co. RACES Net (Texas)	3993 50,560	2400 1400	Alt/T Alt/Sn
Ga. Cracker Emerg. Net (G.C.E.N.)	3995	1300 2230	Sn T-Th
Ga. Single Side Band Net (GSSBN)	3970	0100	T-S
Goose River Net	1820 1980	1500	Sn
Ind. Side Band Net (ISN)	3920	0030	Dy
Inter Mountain Amateur Radio Net (IMARN)	28,900	0300	Th
Inter-Mountain Emerg. Net (IMN) (W. Va.)	29,600	0200	Spec.[3]
Interstate Single Sideband Net	3985	0100	Dy
Kings County AREC, CD Emerg. & Traffic Net (N. Y.)	50,400	0130	Th
Lake Erie Emerg. Net	29,150	0100	M
Lansing Sunday Net (LSN) (Mich.)	3885	1600	Sn
Levittown N. J. AREC Net (LJN)	7175	0100	M
Los Angeles Amateur Radio Emerg. Council Net	29,500	2015	M
La. Traffic & Emerg. Net (LAN)[2]	3615	0100	T-S
Marion County AREC Net (Ind.)	50,700	0100	W
Mass Mobileer Emerg. Net (M.M.E.N.)	50,850	2400	Sn
McDonough County 6 Meter Emerg. Net (MDN) (Ill.)[2]	50,350	0300	T
McPherson Amateur Radio Club Net (Kans.)	145,080	0230	W
Mich. City 2 Mtr Net	50,160	0030	Th
Middle Tenn. 6 Meter Net	50,600	0130	T
Mid-Island 6 Meter Net (MI) (N. Y.)	50,900	0030	W
Minn. 160 Meter Net	1810	0030	TF
Missoula Area Emerg. Net (Mont.)	3890	1600	Sn
Moultrie County Emerg. Net (Ill.)	28,700	0300	1/3F
Nashville-Davidson Co. Civil Defense Net (Tenn.)	50,700	0130	F
Nebr. C.D. Net, Area No. 3 (NCD3)	1997	0230	TTh
Nebr. Section Net (NEB)[2]	3525	0100	Dy
New Orleans Area C.D. Net	50,400	0200	W
News Net Mass (N.E.W.S.)	50,850	0600	Dy
Ninth Regional Net (9RN)[2]	3640	2330 0200	Dy
N. D. CW Net[2]	3670	0030	TThS
North West Texas Emerg. Net	3950	1400	Sn
Oak Ridge AREC Net	50,500	0100	Th
O'Brien County RACES Net (Iowa)	3900	1415	1/3Sn
160 Meter N. Dak. Screwball Net	1992	1830	M-S
Orbiteer's Net	50,850	0130	T
Panhandle Weather Net (P.W.N.)	3940	2330	Dy
Passaic Valley Traffic Net	146,898	0100	T
Penowva Phone Net	50,520 145,350	0100 0100	W Th
Potomac-Rappahannock Valley Net (PRVN)	3935	1400	1/3Sn
Prince Georges County AREC Net (PGAREC) (Md.)	145,660	0100	W
Queens Amateur Radio Emerg. Corps Two Meter Net (N. Y.)	145,800	0030	T
RACES Region One Net	3500.5	0130	F
Red Rocks Amateur Radio Club Net (RRARC)	3555	0300	T
Region 6, Office of Civil and Defense RACES Network	3500.7	0230	W
Sangamon County AREC 75M Net (Ill.)	3877	1930	Sn
Sangamon County A.R.E.C. 10M. Net (Ill.)	29,000	0130	Th
Saskatchewan CW Net (SASK)[2]	3685	0200	MWFS
Schuykill County Brass Pounders Net (SCB)[2]	3708	0030	TThS
SCRTS RTTY Net (Calif.)	147,850	0400	W
Sioux Falls Emerg. Net	144,900	0300	MTh
SKETO Net (Calif.)	3910	0400	TThS
So. Dak. Net	3870	1400	M-S
Southern Tier 8-Ball Net (ST8BN) (N. Y.)	3900	1600	Sn
Southtown AREC & RACES Net (Chicago)	29,640	0130	T
Teenage Fone Net (TAFN)	3950	2030	M-F
Ten Meter Wheat Belt Net	28,450	0300	Dy
Tenn. Single Side Band Net	3980	2400	MWF
Tenth Region Net (TEN)[2]	3545	2300 0145 0330	Dy

A.R.R.L. ACTIVITIES CALENDAR

Mar. 2: CP Qualifying Run — W6OWP
Mar. 3–5: DX Competition (phone)
Mar. 20: CP Qualifying Run — W1AW
Mar. 17–19: DX Competition (c.w.)
Apr. 5: CP Qualifying Run — W6OWP
Apr. 15–16: CD Party (c.w.)
Apr. 22–23: CD Party (phone)
Apr. 18: CP Qualifying Run — W1AW
May 4: CP Qualifying Run — W6OWP
May 17: CP Qualifying Run — W1AW
June 7: CP Qualifying Run — W6OWP
June 10–11: V.H.F. QSO Party
June 15: CP Qualifying Run — W1AW
June 24–25: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and *QST* in which more details appear.

Feb. 25–26: YL-OM Phone Contest, YLRL (p. 75, last month).
Mar. 11–12: YL-OM C.W. Contest, YLRL (p. 75, last month).
Mar. 20: W1NJM High Speed Code Test, Connecticut Wireless Assn. (p. 77, this issue).
Apr. 15–16: The French Contest (phone), REF (p. 70, this issue.)
Apr. 29–30: N.H. QSO Party (details next month.)

Topeka Kansas 10 Meter Emerg. Phone Net	29,600	1500	Sn
Towaco-Montville-Pinebrook AREC Net	146,820	2400	M
Tri-Cities Net	29,000	0200	Dy
Trico Radio Net (Mo.)	3885	1430	Sn
Two Meter Broward Emerg. Net (2BEN) (Fla.)	145,320	0100	W
Union County 6 Meter A.R.E.C. Net (N. J.)	50,250	0030	T
U. S. Coast Guard Auxiliary Net	3970	0130	3/F
	7170		
	7270		
	29,640		
Vermont Net (VTN)[2]	3520	2330	M-S
Water Wonderland Net (WWN) (Mich.)	7164	1900	S
Westchester Phone Net	21,300	0100	M
Westmoreland Co. Sector One Civilian Defense Net (Pa.)	29,360	0100	W
Whittier CD & Emerg. Communication Net (Calif.)[2]	3885	0415	F
Winston-Salem CD Two-meter Network (N. C.)	147,600	0100	WF
WYO CD Net	3537.5	0200	Th
Zone 5 of the South Texas Emergency Net	3860	0015	T
	3815	0100	W

[1] Correction to previous registration.
[2] Part of ARRL National Traffic System.
[3] Net meets on 10th, 20th and 30th of each month by *local* time. You figure it out.

DXCC Notes

Announcement is hereby made of the addition to the ARRL Countries List of Bajo Nuevo. A territory claimed by Colombia, Bajo Nuevo is situated in the Caribbean Sea approximately 400 miles NNW of Colombia and approximately 250 miles NNE of the Colombian island of Providencia. The DXCC listing of Roncador Cay & Serrana Bank separates Bajo Nuevo from the island of Providencia. This addition is in accordance with Point 2 and 3 of the Country Criteria as explained in the April, '60 issue of *QST* on page 80. DXCC credit claims may be made for this addition starting May 1, 1961. Confirmations for contacts with Bajo Nuevo must be dated November 15, 1945 or later. DXCC claims for Bajo Nuevo credit received before May 1, 1961 will be returned without credit.

DX CENTURY CLUB AWARDS

From December 1, 1960 to January 1, 1961 DXCC Certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

HONOR ROLL

W8JIN....306	W9NDA....301	W6EBG....299
PY2CK....306	W5ADZ....301	W9YFV....299
W4DQH....305	W2BXA....301	W2HUQ....299
W3JNN....304	ZL2GX....300	W7GBW....299
W3GHD....304	W1FH.....300	G3AAM....298
W8DMD....303	W2AGW....300	W6SYG....298
KV4AA....303	W1GKK....300	W7GUV....298
W6AM.....303	W1ME.....300	G4CP.....298
W6CUQ....302	W8BRA....300	W4BPD....297
CE3AG....302	W3KT.....300	4X4DK....297
W8BKP....302	W8HGW....299	W6ENV....297
W9RBI....302		W6YY.....297

Radiotelephone

PY2CK....306	W6YY.....296	W6AM.....290
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• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: DUI. RM: AXA. PAM: IVS. New OES appointments go to K3s AVX, HIN and NCD. The Santa Claus, or New Gear Dept.: To GYP a new 813 final, to K3IXD a Heath-Sixer, to EAN a new SX-101A and first JT1 QSO, to K3GSU a Twoer, to EML a 24-hour clock, and to MFW a new daughter. K3ANU made WAC. K3MLP added a Knight v.f.o. to the shack. DZL has been reactivated and now is using an ART-13. K3KFD made 203 QSOs in 23 days, 100 of them on 6 meters. New Officer Dept.: Carbon ARC—K3EXW, pres.; GZI, vice-pres.; AIW, secy.; K3JLW, act. mgr. Frankford RC—HHK, pres.; KVQ, vice-pres.; KDF, secy.; MQC, treas. Council of ARC of Delaware Valley—JFI, chairman; AYG, vice-chairman; IIO, secy.-treas. Elizabethtown ARC—MFW, pres.; CNS, vice-pres.; KZX, secy.; UOU, treas. ZQP and K3KBN are now General Class licensees. OVU is now operating as 9G1 from Worawora, Ghana. He is looking for E. Pa. stations to keep in contact with his children Stateside. The award of BPL goes to ten section traffickers: CUL, VR, EML, IVS, K3s GSU, HWP, WHX, KDP, CRU and IPK. YLL was snowbound and couldn't get to his shack for more than a week. HNK's traffic count in the future will be around 300 because he has taken up bowling as a sideline. On Apr. 9 at 1:30 P.M. the Hilltop Transmitting Assn. will hold its 3rd Annual Ham Auction. Everyone is invited. GES will be chief auctioneer. K3BHU is starting her second year as secretary of the Professional Freeloaders Net. K3JFQ spent the holidays in South America, while K3MVO was in Kentucky. K3LEF's YL is now his XYL. K3HIE has a new rig on 3510 kc. He is the son-in-law of QV. EML handled 27 pieces of traffic for a girl in a Virginia hospital who has cancer. Your SCM tries to keep astride of the times but a number of communications have been received lately without any return address. HPW, WHX, KDP and CRU will receive BPL cards when I receive their addresses. Traffic: W3CUL 12301, VR 1552, EML 1380, IVS 1259, K3GSU 982, HWX 844, HWP 823, W3HNK 302, K3KDP 279, CRU 269, JLW 219, BHU 154, W3NNL 141, MFW 133, K3IPK 130, DZB 125, HEX 112, W3AXA 96, K3CAH 90, JSX 82, DCC 81, W3BFF 58, K3MVO 56, W3NF 55, K3HTZ 53, JHT 52, W3KMD 51, UIU 51, K3AOX 50, DEM 40, W3ITI 40, WHK 40, BUR 39, OY 37, BNR 35, FKE 19, ADE 12, K3LZL 11, W3ZRQ 10, K3KFD 9, W3EEN 8, EAN 6, K3IXD 5, W3ELI 4, GYP 3, HZZ 3, NQB 3, K3AKN 2, CNN 1, W3JSX 1, K3MLP 1, W3PVY 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—SEC: CVE. MDD Traffic Net meets on 3650 kc. Mon.-Sat. at 0015Z, MEPN (phone) on 3820 kc. Mon., Wed. and Fri. at 2300Z and Sat. and Sun. at 1800Z. MDD AREC Nets every Wed. at 0100Z on 3521 and 7042 kc., also 6 and 2 meters. New appointments: HQE and K3KPZ as ORSs; K3CWG as OES; HQE as OPS and OO. LDD is the new EC for Harford Co., Md. AHQ is resting and rebuilding after a long spell as the section's most active OO. BUD reports his son is ready for the Novice Class exam. 2CBD has moved into MDDC and will be active here for a while. CDG reports the passing of ZTY. CDQ looks forward to more activity in 1961. K3CRF is busy with emergency work in Sussex County, Del. K3CWG reports much activity on 6 meters. K3CXC is operating on 432 Mc. and is looking for skeds on either 3300 Mc. or 10,000 Mc., where he is equipped with automatic recording equipment. K3DCP reports renewed interest in the Baltimore ARC, which now meets the 3rd Mon. of each month. EEB is moving into his new house. The Washington RC had an operator from marine WMH Baltimore as speaker at its Dec. 2 meeting. After many years in ham radio EFZ is getting a bang out of traffic and net operation. The FSARC had Director Crossley as a speaker at its Dec. 19 meeting. 1961 officers of the FSARC are ENU, pres.; K2MAX, vice pres.; WV6LDD, secy.; W7RAK, treas. K3EJF reports in from Laurel. EOV says it's a problem to get his mobile equipment in his new station wagon. EQK is busy with MEPN activity. K3GKF is fast becoming the section's leading award contestant. The National Capitol V.H.F. Society presented K3GMD with an electronic artificial larynx at his hospital room on Christmas Day! K3GMV reports 196 messages originated from the VA Hospital at Perry Point, Md., before Christmas and that the hospital's new amateur station soon will be in operation. K3GVE has a new vertical for 10, 15 and 20 meters. K3GZK has a new HT-37 after selling his DX-100. The PVRC had its big Christmas Party at the Black Saddle. K3HJD is back on after repairs. HKS checks in from Wilmington. K3HPG says activity is increasing around Hagerstown. Let's have more reports from Western Md. stations. HQE is ready to go after having his teeth out. K3HRN reports in by radio. K3IZM says things are good on 50 Mc. JME has a new vertical and Tri-bander. JSK says school interferes with operating activity. K3JYZ says December was some month for traffic! JZY likes CD Parties. KHA checks in from Baltimore. K3KHK is near DXCC with his new vertical. K3KHN has a new FCV-2 converter. KLA is home from the hospital. K3KPZ made the BPL. K3LFD needs more operating time. KN3LLR received his 15-w.p.m. sticker. K3LUQ is trying s.s.b. on 50 Mc. K3MDL likes his new DX-100. KN3NCM passed the Novice Class exam through the help of K3WBJ. KN3NFJ has a new converter. OSF keeps up OO activity. TN is back on the air. UCR checks in by phone. UE finally has all 3RN appointments filled. K3WAG is NCS for MDD on Wed. K3WBJ made the BPL with hospital traffic. YTW calls in from Eastern Shore. ZAQ is active as an OO in Baltimore. ZNW is busy with the AREC. Traffic: K3KPZ 360, WBJ 262, W3UE 249, K3GMV 196, HRN 195, JYZ 179, MDL 76, W3TN 64, AHQ 52, K3LFD 45, WAG 45, W3BKE 38, EOV 32, K3GZK 28, W3HQE 26, EEB 25, EFZ 24, EQK 14, KHA 14, ZNW 12, K3EJF 11, KN3NFJ 11, W3BUD 10, JZY 10, K3DCP 6, LUQ 6, W3CDG 4, K3KHK 4, KN3LLR 3, K3CWG 1, W3JSL 1. (Nov.) W3UCR 1.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: W2YRW. RMs: W2BZJ, W2HDW and W2ZI. W2UKS is operating MM aboard the MV *Rose Knot* out of Mayport, Fla. His home QTH is Ocean City, N.J. Emerg. Phone & Traffic Net totals for December: 31 sessions, QNI 609, traffic 179. K2DEI, Maple Shade, added another BPL card to his collection. K2RXB, Margate, is giving s.s.b. a fling. Gloucester County ARC officers are W2LVW, pres.; W2GQK, vice-pres.; K2YWR, rec. secy.; W2JOZ, treas.; W2AFZ corr. secy. With regret we report the passing of K2DFR/-K2DHJ, Millville. WA2ARJ, Millville, reports that the Bridgeton Area Radio Klub c.w. class is doing very fine. K2VNL, Cranford, is the new NJN manager. Congratulations to W2RXL, who did a fine job in that spot. The Levittown (N.J.) ARC started a theory class in January. WA2KCR, club corr. secy., supplies us with the news. W2VX, Westville, has been hospitalized. We wish him a speedy recovery. W2NSF was top SJRA scorer in the Sept. V.H.F. Party. The SJRA was tops in the six-transmitter class last Field Day. Gloucester Co. ARC is offering a certificate for contacting its club members. Ask W2AFZ for details. Also contact the Southern Counties Radio Club about its certificate. WA2IBG Marlton, K2MOV Delance, WA2ARJ Millville and WV2LCB Moorestown, are recent OBS appointees. Burlington Co. EC K2ECY has added a 2-meter net to the County's AREC activities. WA2HJI is NCS. The newly-elected directors of the SJRA are K2HOD, K2MKD, K2DEI, W2HBE, W2ADA, W2OSD and WA2HJI. K2DEI received the club's "Outstanding Amateur of the Year" award. Many fine reports were received this month from appointees and clubs. Keep up the fine work. Traffic: K2DEI 279, W2RG 268, K2RXB 215, W2BZJ 126, W2ZI 69, K2JGU 54, WA2MEQ 35, W2BEI 22, K2SNK 21, W2IU 16, K2SOX 12.

(*Continued on page 90*)

No. 74 of a Series

PUTTING SATELLITES TO WORK IN AMATEUR RADIO

PART 2: PROPAGATION LOSS AS A DETERMINANT IN SYSTEM DESIGN

IN PART 1 OF THIS SERIES, it was shown that received power levels of approximately 1.4×10^{-15} watts for single-sideband transmission and of 0.7×10^{-16} watts for CW transmissions are required. It was assumed that the effective noise temperature was 500° K which corresponds to an effective noise figure F_E of 2.7 where $F_E = \frac{T_E}{290} + 1$. (In decibels the noise figure is approximately 4.3 db.) It was also assumed that the bandwidth was 2,000 cps for SSB and 100 cps for CW, and that the required received power was 100 times the noise level. In this part of the series, the required received power levels will be used as a basis for the determination of the required receiving and transmitting antenna gains for operation in the 2300- to 2450-Mc amateur band. Echo and the Moon will be used as the scattering satellites. We first need some physical facts about each.

ECHO WAS LAUNCHED in a circular orbit about the earth at a radius of approximately 5,000 miles. Echo has a diameter of about 100 feet and subtends an angle of the order of 1/1000th of a degree when viewed from the earth. It traveled at a speed of about 16,000 miles per hour and made a complete revolution in a little less than two hours. It was visible for periods of around 15 minutes per revolution. The high speed and small subtended angle make tracking of Echo quite difficult. The high speed also caused a maximum Doppler shift in large frequency of the order of 0.1 Mc for a 2400-Mc carrier signal. The time required for a radio signal to make a round trip to Echo was approximately 10 milliseconds so that the time delay was negligible.

THE MOON'S ORBIT about the earth is also approximately circular and has a radius of around 240,000 miles. The Moon has a diameter of about 2,200 miles and subtends an angle of about ½ degree when viewed from the earth. The Moon travels at a speed of about 2,300 miles per hour and makes a complete revolution in around 27 days; it is visible for comparatively long periods. The slower speed and larger subtended angle make tracking easier for the Moon than for Echo. The slower speed also means that the Doppler frequency shift for the Moon is considerably smaller than for Echo — the maximum shift being of the order of a few hundred cycles for a carrier frequency of 2400 Mc. The time required for a radio signal to make a round trip to the Moon is about 2½ seconds — an excessive amount of delay for many communication purposes.

THE RADAR propagation formula, which expresses the received power P_R in terms of the transmitter power P_T, will be used to estimate the required receiving and transmitting antenna gains G_T and G_R (relative to an isotropic radiator) for a given operating wavelength λ, a given scattering cross section A_S and for a given distance r to the scattering object. When this formula is rearranged to separate the factors which can be controlled from those which cannot, one obtains the following in case you really are interested:

$$\frac{P_R}{P_T G_T G_R \lambda^2} = \frac{A_S}{64\pi^3 r^4}$$

When the scattering cross section is assumed equal to the area of a flat disc of the same radius as that of the sphere, the right-hand side of this equation yields approximately 1.4×10^{-26} inverse square meters for the Moon and 5.55×10^{-28} for Echo; hence the difference in favor of the Echo is less than 6 db. This result is based on the assumption that the reflection efficiency is the same for the Moon as for Echo. Actually the Moon has a lower efficiency. One can conclude that the system requirements are not too greatly different for Echo and Moon signal bouncing.

THE RADAR FORMULA shows that for a transmitter power output of 100 watts, an operating frequency of 2400 Mc and identical receiving and transmitting antennas, antenna gains of 45 db are required to receive CW signals when the receiver pass band is 100 cps. Parabolas 30 feet in diameter would provide the required gain. For single sideband, the received signal power must be about 20 times as large as for CW. This could be achieved if the diameter of the parabola were doubled. If a signal level equal to the noise level were acceptable, the parabolas could be reduced in diameter by almost one-third.

IN A LATER ISSUE of *OST*, other system considerations will be discussed.

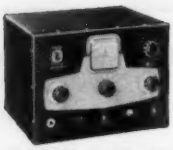
— DR. ROBERT E. BEAM, W9BGZ

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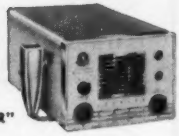


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"NAVIGATOR"



"6N2"



10-METER "MESSENGER"

"ADVENTURER" TRANSMITTER

Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . . instant bandswitching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.

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"NAVIGATOR" TRANSMITTER/EXCITER

40 watts CW input . . . also serves as a flexible VFO Exciter. 6146 final amplifier tube—bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes, less crystals.

Cat. No. 240-126-1 . . Kit . . . . . **Amateur Net $149.50**
Cat. No. 240-126-2 . . Wired . . . . . **Amateur Net $199.50**

"6N2" TRANSMITTER

Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with the Viking I, II, "Ranger", "Valiant" or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

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Cat. No. 240-201-2 . . Wired . . . . . **Amateur Net $169.50**

10-METER "MESSENGER" TRANSCEIVER

Complete 10-tube (including rectifier) crystal-controlled transceiver. 10 watts input—pre-tuned for 29.4 to 29.7 mcs—covers any 5 frequencies within a 300 kc segment of 10-meter band. Excellent receiver sensitivity and selectivity. ANL, AVC, and positive-acting Squelch. With tubes, push-to-talk microphone, and crystals for national calling and emergency frequency (29,640 kc).

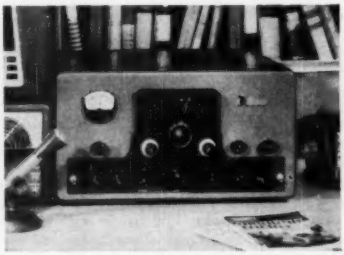
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"RANGER" TRANSMITTER/EXCITER

This popular 75 watt CW or 65 watt phone transmitter will also serve as an RF/audio exciter for high power equipment. Completely self-contained—instant bandswitching 160 through 10 meters! Operates by built-in VFO or crystal control. High gain audio—timed sequence keying TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

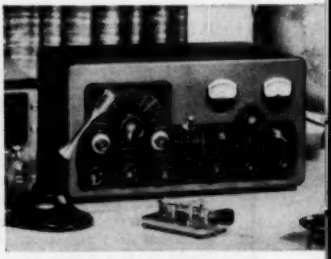
Cat. No.	Amateur Net
240-161-1 . . Kit	$229.50
240-161-2 . . Wired and tested . . .	$329.50



"VALIANT" TRANSMITTER

275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant bandswitching 160 through 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

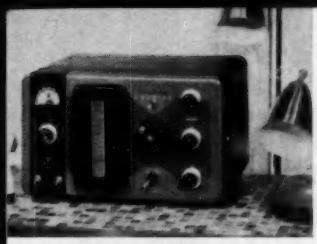
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240-104-2 . . Wired and tested . . .	$439.50



"FIVE HUNDRED" TRANSMITTER

Full 600 watts CW—500 watts phone and SSB. (P.E.P. with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

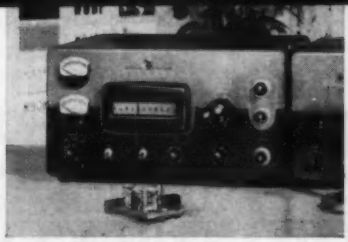
Cat. No.	Amateur Net
240-500-1 . . Kit	$749.50
240-500-2 . . Wired and tested . . .	$949.50



"COURIER" AMPLIFIER

Rated a solid 500 watts P.E.P. input with auxiliary SSB exciter as a Class B linear amplifier; 500 watts CW or 200 watts AM linear. Self-contained desk-top package—continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts depending on mode and frequency desired. TVI suppressed. With tubes and built-in power supply.

Cat. No.	Amateur Net
240-352-2..Wired and tested	$289.50



"THUNDERBOLT" AMPLIFIER

The hottest linear amplifier on the market—2000 watts P.E.P. (twice average DC) input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs.—instant bandswitching. Drive requirements; approx. 10 watts Class AB_2 linear, 20 watts Class C continuous wave. With tubes and built-in power supply.

Cat. No.	Amateur Net
240-353-1..Kit	$524.50
240-353-2..Wired and tested	$589.50



"6N2 THUNDERBOLT" AMPLIFIER

1200 watts (twice average DC) input SSB and DSB, Class AB_1; 1000 watts CW, Class C; and 700 watts input AM linear. Continuous band-switched coverage on 6 and 2 meters. TVI suppressed. Drive requirements: approx. 5 watts Class AB_1 linear, 6 watts Class C CW. With tubes and built-in power supply.

Cat. No.	Amateur Net
240-362-1..Kit	$524.50
240-362-2..Wired and tested	$589.50

The world at your fingertips!



VIKING "KILOWATT" AMPLIFIER

The only transmitter that provides maximum legal power in all modes—SSB, CW, and plate modulated AM. Two 4-400A tubes in Class AB_2 easily deliver 2000 watts P.E.P. (twice average DC) in SSB mode—1000 watts input AM with two push-pull 810 tubes in Class B modulator service—1000 watts input Class C CW. High efficiency pi-network output circuit. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB. Pedestal contains complete unit. With tubes.

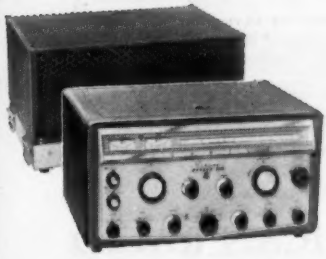
Cat. No. 240-1000..Wired and tested.....Amateur Net $1595.00

Matching desk-top and three-drawer pedestal.

Cat. No. 251-101-1.....FOB Carry, Pa. $132.00

The very finest SSB equipment you can buy!





FILTER-TYPE SIDEBAND—HIGHLY STABLE OPERATION AND UNUSUALLY SHARP RESPONSE!

INVADER

The transmitter you've been waiting for—with more exclusive features than any other Transmitter/Exciter on the market today! Instant bandswitching 80 through 10 meters—no extra crystals to buy—no retuning necessary. Rated 200 watts CW and SSB input; 90 watts input on AM. Unwanted sideband and carrier suppression is 60 db or better! Wide range pi-network output circuit. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested with tubes and crystals.

Cat. No.	Amateur Net
240-302-2	$619.50

INVADER-2000

Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts input AM! Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested with power supply, tubes and crystals.

Cat. No.	Amateur Net
240-304-2	$1229.00

HI-POWER CONVERSION

Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader-2000"—a solid 2000 watts P.E.P. (twice average DC) input SSB, 1000 watts CW and 800 watts input AM. Completely wired, and tested—includes *everything* you need—no soldering necessary—complete the entire conversion in one evening!

Cat. No. 240-303-2..Hi-Power Conversion, complete.....Amateur Net $619.50

Free Catalog

Write for your free copy of our newest amateur equipment catalog—complete specifications, illustrations and schematics on Viking amateur equipment.

E. F. JOHNSON COMPANY

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1961 EDITION

The RADIO AMATEUR'S HANDBOOK

By A.R.R.L.

AN INVALUABLE reference work and text for everyone—hams, engineers, lab men, technicians, experimenters, students, purchasing agents.

Distributors throughout the Nation have the 1961 Edition in stock. Better get your copy of this complete Handbook now. The demand is tremendous!

In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, up-to-date information invaluable to ham and engineer alike. Every field of ham radio is covered: transmitting, both c.w. and 'phone; single-sideband and a.m.; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; miscellaneous data; procedures; station operation, etc.

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- **Plus thorough treatment of such subjects as assembling and operating a station, BCI and TVI, construction practices, etc. — *and fully indexed and completely illustrated throughout. You can locate in a jiffy what you want.***

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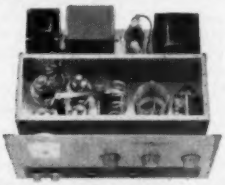
Heathkit® Amateur Gear — tops in quality and economy



HERE'S A NEW HEATHKIT GROUNDED GRID KW LINEAR AT A RECORD-SMASHING LOW PRICE . . . JUST $229.95

The new Heathkit "Warrior" is a completely self-contained, desk-top kilowatt linear, loaded with special features, at half the cost of comparable units! Compare feature for feature, quality component for quality component, you'll find no shortcuts . . . only the finest watt-per-dollar value in a linear amplifier on the amateur market today!

Maximum power input: SSB—1000 watts P.E.P., CW—1000 watts, AM—400 watts (500 watts using carrier controlled modulation), RTTY—650 watts. **Driving power required:** 50 to 75 watts—depending on frequency. **Output circuit:** Variable pi-network (50 to 75 ohms). **Input circuit:** Broad banded—requires no tuning. **Input impedance:** Approx. 70 ohms. **Band coverage:** 80, 40, 20, 15, 10 meters. **Panel metering:** Switch-selected, grid current, plate current, high voltage and relative power output for ease of loading. **Tube complement:** 4-811A, 2-866A. **Size:** 19¼" W x 11⅞" H x 16" D.



This inside view shows the neat circuit layout and husky components that emphasize quality. Note the internal shielding of plate circuit for maximum protection against TVI.

CHECK THESE FEATURES . . .

Completely self-contained . . . HV, Fil. and Bias supplies built in.
Versatile . . . May be driven by any 50 to 125 watt transmitter or exciter—no matching or swamping network required.
Efficient . . . Stable grounded grid circuitry allows most driving power to appear in output for up to 70% efficiency.
Oil-filled capacitor . . . And 5-50 henry swinging-choke provide the excellent dynamic regulation required for high peak power output with low distortion.
Inexpensive tubes . . . 4 paralleled 811A's and 2-866A's, forced-air cooled by silent built-in fan.
Design . . . Special low-capacity filament transformer—requires less driving power—eliminates broad band filament RF choke.
Exclusive . . . Internal RF shielding of plate circuit for maximum TVI suppression.
Interlocked switching . . . prevents accidental application of HV before switching on filament and bias.
Neutralized . . . For the last word in stability in conjunction with grounded-grid operation.
Rugged construction . . . 16 gauge steel chassis—⅛" aluminum front panel—welded one-piece cabinet.
Easily assembled . . . Average time 8 hours.
Model HA-10, . . 100 lbs. . . . $23 dn., $20 mo. **$229.95**

HEATHKIT® by DAYSTROM **HEATH COMPANY** Benton Harbor, Michigan



Model DX-60 **$82.95**

- Built-in low pass filter
- Neutralized 6146 final amplifier
- Grid block keying
- Handsome low profile styling

more features, better performance in this new Heathkit transmitter

PHONE AND CW TRANSMITTER KIT (DX-60)

Smart modern styling . . . clean, rugged construction . . . and conservatively rated components all add up to ease of assembly, trouble-free operation and fine performance in the new DX-60 Transmitter. Offering far more than any other unit in its price and power class the DX-60 features a built-in *low pass filter* for harmonic suppression, *neutralized final* for high stability, *grid block keying* for excellent keying characteristics and easy access to crystal sockets on the rear chassis apron. A front panel switch selects any of four crystal positions or external VFO. Modulator and power supply are *built in. Single knob bandswitching* for 80 through 10 meters and the *pi-network output* provide complete operating convenience. A tune-operate switch provides protection during tuneup and a *separate drive control* allows adjustment of drive level without detuning driver. *Panel meter* shows final grid or plate current. A fine kit for the beginner as well as general class amateur, the DX-60 may be run at reduced power for novice operation. Operates CW or AM phone with crystal or VFO control. Power input is *90 watts peak*, carrier controlled phone or CW. Construction of the DX-60 is a breeze, with its clean circuit layout, precut and cabled *wiring harness* and the complete, informative instructions furnished. The handsomely-styled finished unit measures only 13¾" W x 11½" D x 6½" H. 29 lbs.

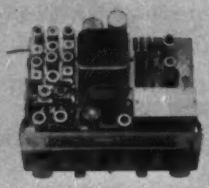
Model DX-60...$8.30 dn., $8 mo.....**$82.95**

you get twice as much for your budget



Model HW-20 **$199.95**

- Tracked VFO & Exciter Stages for single knob tuning
- 10-watt RF output to antenna—6360 final
- Built-in low pass filter
- Built-in 3-way power supply for 117 VAC, 6 VDC, 12 VDC
- Push-to-talk ceramic element microphone



new transceivers for 6 & 2 meter nomads

VHF TRANSCEIVER KITS (HW-10 & HW-20)

"Mobile" or "Fixed", the new "Shawnee" 6-meter or "Pawnee" 2-meter transceivers bring you unprecedented performance, for each is a complete AM & CW Transmitter/Receiver combination with features unmatched at this price . . . just connect an antenna and you are in business! Transmitters feature a *built-in VFO* with all frequency determining components mounted on a "heat sink" plate for temperature stability and *four* switch-selected crystal positions for novice, CAP, MARS or net operation. VFO and all exciter stages are tracked for convenient *single knob tuning* over any 500 kc band segment (greater excursions require simple re-peaking of final). A VFO "spotting" switch is provided to "zero in" signals with transmitter off-the-air. The 6360 dual-tetrode final RF amplifier provides 10 watts of power *output* to the antenna and a built-in *low pass filter* is incorporated to suppress harmonics and other spurious radiation. The *dual-purpose modulator* provides a full 10 watts of audio for high level plate modulation of the final RF amplifier or 15 watts of audio for paging or public address use, selectable with push-pull switch. Superheterodyne receivers feature double conversion with first oscillator crystal-controlled. All oscillators are voltage regulated for stability. A large slide-rule dial and vernier tuning provide more than ample bandspread for both receiver and VFO. RF gain, BFO, ANL, Squelch, AVC on/off and transmitter controls are front panel mounted. *Tuning meter* is automatically switched to read signal strength or relative power output. Units come complete with built-in speaker, heavy duty AC & DC power cables, primary fused relay, adjustable mounting bracket and push-to-talk ceramic element microphone with coil cord & mounting clip. 6" H x 12" W x 10" D. 34 lbs. each.

Model HW-20 (2 meters)...$20 dn., $17 mo.....**$199.95**

Expected Shipping Date Feb. 25.

Model HW-10 (6 meters) Coming Soon.



Model HW-29A
$44.95

lowest cost transceivers on the air

- Operate from low-frequency crystals for greater stability
- Push-to-talk Transmit/Receive switch
- Variable receiver tuning
- Built-in AC power supply—easy conversion to mobile operation, using accessory vibrator power supply

2, 6 & 10 METER TRANSCEIVER KITS (HW-30, 29A, 19)

These three outstanding transceiver models bring you top performance at the lowest prices offered in complete amateur facilities. Each model has a crystal controlled transmitter and tunable, superregenerative receiver with RF preamplifier. Receivers pull in signals *as low as 1 μv* and the *5 watt* transmitters are ideal for emergency work or "local" net operation. Features include push-to-talk transmit/receive switch, metering jack, ceramic element microphone, and two power cables. Less crystal. 10 lbs. each.

Model HW-19 (10 meter)...$4 dn., $5 mo.....**$39.95**
Model HW-29A (6 meter)...$4.50 dn., $5 mo.....**$44.95**
Model HW-30 (2 meter)...$4.50 dn., $5 mo.....**$44.95**

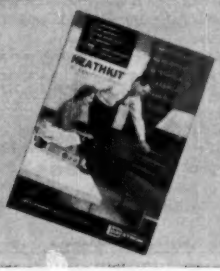
Attn. HW-29 owners: Convert your "Sixer" to the new improved "A" model with this easy-to-install conversion kit. Allows use of 8 mc crystal for maximum stability.
Model HWM-29-1 1 lb. **$4.95**

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FREE CATALOG

Lists over 200 kits. Send for your free copy today!





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Fill out the order blank below. Include charges for parcel post according to weights shown. Express orders shipped delivery charges collect. All prices F.O.B. Benton Harbor, Mich. A 20% deposit is required on all C.O.D. orders. Prices subject to change without notice.

Please send the following HEATHKITS:

ITEM	MODEL NO.	PRICE

Ship via ( ) Parcel Post ( ) Express ( ) COD ( ) Best Way

( ) SEND MY FREE COPY OF YOUR COMPLETE CATALOG

Name _____

Address _____

City _____ Zone ___ State _____

Dealer and export prices slightly higher.

AN APPEAL TO INTELLIGENCE

A product that is consistently advertised in *QST* month after month, year after year, has to be good. Over 10,000 GOTHAM antennas have been purchased by *QST* readers. Even the "price-is-no-object" customers choose GOTHAM antennas on the basis of performance and value. Select your needs from this list of 50 antennas.

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GOTHAM Dept. QST

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Enclosed find check or money-order for:

TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

6–10 TWO BANDER	☐	$29.95
10–15 TWO BANDER	☐	34.95
10–20 TWO BANDER	☐	36.95
15–20 TWO BANDER	☐	38.95

TRIBANDER

Do not confuse these full-size Tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is broad banded. It does not have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

☐ 6-10-15 $39.95 ☐ 10-15-20 $49.95

2 METER BEAMS

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

☐ Deluxe 6-Element 9.95 ☐ 12-El 16.95

6 METER BEAMS

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

☐ Std. 3-El Gamma match	12.95	☐ T match	14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match	24.95
☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95

10 METER BEAMS

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30–50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match	25.95
☐ Std. 4-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95

CITIZENS BAND ANTENNAS • Any of our ten meter beams or the V40 vertical is perfect for the CB operator.

FREE 1961 CATALOG

Name.....

Address.....

City.....Zone.....State.....

New! Ruggedized 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.



☐ Beam #R6 (6 Meters, 4-El)....$38.95
☐ Beam #R10 (10 Meters, 4-El).. 40.95
☐ Beam #R15 (15 Meters, 3-El).. 49.95

15 METER BEAMS

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95

20 METER BEAMS

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34.95	☐ T match	37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

FACTS

ON THE GOTHAM

V-80 VERTICAL ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Withstands 75 mph windstorms.
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price. ONLY $16.95.

73,
GOTHAM



YOU COULD WORK WONDERS WITH A GOTHAM VERTICAL ANTENNA!

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

City.....Zone.....State.....

Station Activities

(*Continued from page 80*)

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF and W2ZRC. PAM: W2PVI. NYS C.W. meets on 3615 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3510.5 and 3993 kc. (s.s.b.) at 0900 Sun.. TCPN 2nd call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600. W2RUF, W2EZB, W2OE and WA2CIG were awarded BPL certificates for December traffic. W2RUF reports that NYS C.W. handled 6471 messages in 1960. W2FEB was voted the most valuable member and WA2CIG won QNI honors. 310 out of a possible 366 (leap year). W2PGA has been appointed OPS and W2QCI OBS. W2YLM has been endorsed as Broome Co. EC. Sidney ARC's 1961 officers are K2MQA, pres.; WA2IZF, vice-pres. and treas.; WA2KZC secy. Greene ARC's officers are W2JVZ, pres.; K2UZK, vice-pres. and treas.; K2RUB, secy. The TARA elected W2NVD, pres.; K2UNY, vice-pres. and act. mgr.; K2ZWG, secy-treas. The Syracuse V.H.F. club elected W2RHQ, pres.; K2TXG, vice-pres.; K2YFY treas.; K2ZRX, act. mgr.; K2TXX, secy. WA2DAC reports a traffic count of 39 during AREC action after a B-52 crash in North Country. The Champlain Valley AREC relayed messages for CAP—33 stations participated in the hunt for the downed flyers. WA2GCH reports that 20 stations participated in civil defense exercise "Go Home," which was a test of school evacuation in Clinton County. The Auburn ARA secretary reports that most of the club members like "WNY" section even though they are in central N.Y. W2QHQ became an Eagle Scout. WA2FEL, WA2EIX, K2INH and K2QVC are on 220 Mc. in the Auburn Area. I neglected to mention the *Rags Review* in a recent column, W2VSP is editor. There are 14 stations active on 224 Mc. in the Syracuse Area; they all use TRC-8 and TRA-19 surplus gear and are v.f.o.-controlled. The mode is f.m. and the power is 12 watts, or 120 watts when TRA-19 amplifiers are used. If anyone is interested in more information I'm sure W2WRC would oblige. K2BWK has been elected mgr. of NYSPTEN. WA2LFA passed the General Class exam and has a Viking I. W2ALR gave a talk on 1296 Mc. at a recent LARA meeting. Plan now to attend the Penn-York Hamfest in June. The Elmira ARA continues to sponsor theory and code classes in conjunction with adult education. Last fall 15 registered and 12 got their Novice Class tickets. The Adirondack RC is sponsoring a club contest, the winner to be the member who submits the highest score consisting of the product of contacts and club members worked during a specified period. Traffic: (Dec.) W2RUF 720, W2EZB 712, W2OE 630, WA2CIG 513, K2RTN 251, K2QDT 210, WA2EYJ 176, W2FEB 163, WA2IYB 141, K2JBX 126, K2TPV 114, WA2CRH 110, K2OFV 76, K2RTQ 63, K2GQU 61, W2PVI 61, W2PGA 58, K2TDG 57, K2MES 44, W2RQF 36, K2DWR 34, K2KCL 34, W2QQK 30, K2RYH 30, W2COB 24, K2MPE 24, WA2FTM 21, W2BLO 14, K2EE 10, W2QCI 10, K2RTE 9, WV2LPI 5, WA2BEX 4, WA2HEC 3, WA2ETM 1. (Nov.) K2RTN 190.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: OMA. RMs: KUN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. New appointees: JT, MBN and QYG as Official Observers. UGV now is operating on 144 Mc. K3CNP has joined the Air Force. MFB has started a slow-speed traffic net on 3585 kc. at 1830 EST. For more particulars, contact MFB at Brockway, Pa. The Conemaugh Valley ARC held its Seventh Annual Supper at Windber this past January. The Cumberland Valley ARC reports via *Valley QRM* that new officers are ESV, pres.; K3HOS, vice-pres.; ACH, secy.-treas.; K3EIN, act. mgr. ACH was in KZ5-Land for a week. The Horseshoe RC reports via *Hamateur News*: LIV, Blair County EC, was very well pleased with the support he received on the Dec. 7 Alert; AUD is in the hospital; the club is forming a Women's Auxiliary; new officers of the H-CAR are WIV, pres.; K3AYV, vice-pres.; K3BPF, secy.; K3CQU, treas.; code and theory classes are held every Thurs. in the Huntingdon County Court House. The Coke Center RC reports: K3HTG has a new B&W rig; 8SYS/3 is back home; a new YL Novice is KN3NOU; K3HHN is building a DX-100B. The Steel City ARC (KWH) put on a spectacular Christmas Party. The Mon Valley ARC (ZHV) elected AOX, pres.; K3BWG, vice-pres.; HOB, treas.; Ken Newman, secy.; PQR, trustee; and K3HJI, fund-raising chairman. Up Erie way: K3BDQ and K3NJH are playing chess on 6 meters; LOS has made DXCC; K3AXS was named by Gov. Lawrence to serve on the Advisory Committee for the state office of the blind. Etna RC reports via *Oscillator*: TOC is home from the hospital and doing very well; the Etna Radio Club now is five years old; CEO has been under the weather. The Nittany ARC reports via *QST de K3HKK*: BDD is on 75-meter phone with low power; MLN recently made his first post-war 160 contact; SLX is working on a six-kw. rig; the club station (K3HKK) is back on the air at a new location. Congratulations to K3HWL, WRE, MFB, KUN and K3GHH on making BPL for traffic-handling during December. My heartiest thanks to all the radio clubs and their secretaries for keeping me informed of their activities via their club bulletins. Traffic: K3HWL 806, W3WRE 635, MFB 519, KUN 303, K3GHH 197, W3LSS 51, K3KMO 14, W3YA 10, UHN 9, K3COT 5, HSE 4, KAP 2.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME. SEC: P8P. RM: USR. PAM: RYU. EC of Cook County: HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. The Central Division Convention, which will be held in Springfield Aug. 26 and 27, will have many surprises in store for the gang who attend. Many manufacturers and their representatives will be there with the latest in equipment displayed in the greatest array of exhibits ever presented at a division convention. Make your plans now to attend. A new General heard is K9SRW. K9VRO's shack has a new Hallicrafters HT-37 and K9ROL is sporting a new HT-32. Both report FB results in the DX band. NSA's new project is the building of a linear. Another Silent Key in this area is OMA. Our condolences to his family and many friends. K2GAX was home visiting his father-in-law, HOA (former SEC of the Illinois section). K9QPJ's new transmitter has a 4X150 and an 804. New officers of the Joliet Amateur Radio Society are K9QMO, K9TDQ, K9ATK and OAR. BQC and K9RUK are experimenting in Klystron equipment on the 3500-Mc. frequencies. K9QMT is NCS for the newly-formed Quigley Preparatory Chicago Area Net. KCR, K9QPJ, K9GTS and K9SEE will direct the RAMS during the new year, being elected at a recent meeting. K9CNE can be heard from Germany daily at 1200Z on 14,320-kc. s.s.b. with the calls DL5BR and DL4USN. K9OZM is working 10 meters with a new Heathkit Tener. K9QAI and his XYL, K9QAJ, have a new TA-33 beam and antenna tower and both report good DX signals. Newly-elected officers of the Starved Rock Radio Club are K9KHZ, NIU, QLZ and PNY. K9QPA finally is on 2 meters. K9PQI asks those interested in forming a traffic net for the Chicago Area to please contact him for details. UBI works as K9VLA during his college stay. BUB is working 2-meter f.m. K9UUP recently was hospitalized with a fractured leg. New officers of the Central Illinois Radio Club (Bloomington) are K9EGM, DHG and K9MLO. SXL is erecting a 30-ft. 6-meter beam. K9RJJ reports that the Peoria Area Radio Club has a City of Peoria Award for those who work eight Peoria stations. Contact him for further information regarding this. JJN, OO, is cleaning house, NCS USR reports that the ILN handled 154 messages in 19 sessions. K9QYW, of the North Central Phone Net, reports a net traffic count of 326. The traffic reported this month by the various stations adds up to one of the highest for this section, and we are happy to award the BPL to IDA, DO, K9BTE, K9QAE, IMN, K9UGY, K9IVG and K9OKD. Traffic: (Dec.) W9IDA 2043, DO 1218, K9BTE 851, QAE 717, W9IMN 571, K9UGY 527, W9MAK 424, K9IVG 277, W9FAW 166, K9CIL 160, OKD 102, SCP 92, W9SXL 92, K9KMH 85, QYW 74, OEW 62, PLF 60, OCU 53, W9DZB 51, K9OZM 48, LXG 37, CRT 36, OAD 31, W9PRN 24, K9PFL 23, QGR 22, RAS 20, WFG 19, JID 17, QFR 17, W9WPC 12, K9LLA 11, QPJ 11, W9AXV 10, K9WEG 10, BIV 4, IYV 4, QMJ 4, SRW 1. (Nov.) W9USR 191, IMN 183, K9OZM 70, GSR 33, PYD 2.

INDIANA—SCM, Clifford M. Singer, W9SWD—Asst. SCM: Arthur G. Evans, 9TQC. SEC: SNQ. PAMs: K9AOM, BKJ, RVM and UKX. RMs: DGA, TT and VAY. Net skeds: IFN, 0900 daily and 1830 Mon.-Fri. on 3910 kc.; ISN (s.s.b.) 1930 daily on 3920 kc.; QIN (training) 1800 Mon.-Wed.-Fri. on 3745 kc.; CAEN (160 meters) daily at 1900 on 1850 kc.; QIN daily at 1900 and RFN 0700 Sun. on 3656 kc. New appointments: JFF as EC for White County, AOJ as OPS, K9RPZ as OBS on 6 meters, ZWN as OO Class II and IV, K9AEK as OO Class III and IV and LNC as OO Class III and IV. K9TFJ keeps a daily 2-meter sked with K9JLA in Danville, Ill. New officers of the Duneland ARA are IGH, HVY, K9LTG and K9PZS. K9CRS received DXCC No. 1947 for 101 countries on phone. The Tippecanoe ARA elected LOT, K9QVW, K9MAK, N8Y and RGY as new officers. New officers of the Tri-State ARS

(*Continued on page 92*)



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are OVB, K9JSK, K9GBB, AIN and K9JQN. New Tech. Class calls in Lafayette are K9MAL and K9AHV. The Western Electric ARC elected K9BSU, K9SVA, KN9YOR and K9OYK to serve in '61. JFJ has a new Collins receiver. DGA is now pounding the green keys. The Gibson ARC elected the following: K9UHQ, FJI, K9SUH and URQ. The Wabash Valley ARC, under the leadership of KT, has taken over the publishing of the *BISON*. The editor is K9IXD. Indiana amateurs are invited to send their news for publication. (Same address as the SCM). FJI has been hit by the 6-meter bug. K9KIM is going RTTY, as is K9RFW, who is doing an FB job as OBS. YB and CLY keep the traffic flowing from Purdue. *Amateur radio exists as a hobby because of the service it renders.* December net reports: IFN 464, ISN 457, QIN 602, RFN 76, QIN (training) 62, RFN 76 and CAEN 6. Making BPL: JOZ, TT, ZYK, VAY, GJS and DGA. Traffic: (Dec.) W9JOZ 1060, TT 739, ZYK 588, VAY 558, GJS 487, MM 395, DGA 304, K9RMQ 238, AOM 126, GBB 119, W9EEO 111, CC 108, K9DUV 105, W9SWD 89, K9TCG 75, W9UQP 74, K9EOT 70, W9FWH 64, RVM 53, K9IXD 51, W9NZZ 51, KN9WET 43, W9DOK 39, BUQ 36, K9LZN 35, W9QYQ 33, UQU 33, EJW 32, HUF 32, K9ILK 32, W9RTH 31, YYX 28, DZC 24, K9MAN 18, W9IMU 16, EGV 14, OCC 14, K9UEF 11, W9BDG 10, K9SSI 9, W9FJI 8, SNQ 7, K9JCE 6, LZJ 6, W9BDP 3. (Nov.) W9EEO 104, BKJ 18, SNQ 18, K9LZJ 17, BUQ 12, OCC 10, K9CRS 9, SSI 9, GFQ 6, BPD 5. W9

WISCONSIN—SCM, George Woida, W9KQB—SEC: YQH. PAMs: NRP and NGT. RMs: VIK and VHP. K9UJJ removed the "N" from his call and has become active on the traffic nets. He reports that his mother received her Novice Class license with the call KN9BUR. Several pieces of test equipment have been purchased by the Mancorad Club for use by the members. K9CET became a member of the OTC, having received confirmation of his having held the call 9BGU in 1922. BEN certificates were received by K9DVA, TMM and CBE. K9SQV has become a MARS station and also a BEN NCS. ONI has raised his power for better MARS and NTS operations. KN9YDY now is operating a new Ranger. K9GDF mailed 78 OO notices to bring his year's total to 637. He has 28 states confirmed by return letters. RKP mailed 39 notices for a year's total of 421. K9RRS, an OES, has a new Drake receiver and 6-meter s.s.b. mixer. Another OES, K9GSC, has a new ten-element beam for 144 Mc. A total of 190 Christmas trees sold by the Sun Prairie Club brought them a new DX-100. Congrats to K9LMX and his wife on the arrival of new YL Dec. 11. DYG, with a year's traffic total of 11,467 and 12 times BPL, became the section's Mr. Traffic for 1960. A reported traffic total of 5013 for December gave the Wisconsin section a year's total of 30,382. K9JXW now is operating all bands with a Valiant, an HQ-170 and separate dipoles for each band. The Milwaukee Club's Old Timers Nite was attended by 62. VD acted as master of ceremonies, showing films of early amateur gear. Applications for OBS, OES, OO, ORS and OPS appointments are solicited. Traffic: W9DYG 1667, CXY 873, W2MTA/9 761, K9GDF 178, W9SAA 460, KQB 301, K9HJS 76, W9VHP 71, KKM 66, K9EQQ 61, W9FXA 53, K9GSC 51, W9MWQ 50, CBE 45, HHX 41, K9SQV 32, DOL 29, W9OTL 27, K9JQA 25, W9DKH 22, WJH 20, K9LWV 18, W9NLJ 14, K9JXW 13, W9VIK 12, APB 11, SIZ 10, ONI 8, KN9YTJ 8, YDY 7, W9YZG 3.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: KØKBV. PAM: KØKJR. RM: KTZ. A new call in Williston is CBN, ex-K5DBL. KJR expressed appreciation to all who checked into the 75-Meter Net and special thanks to NCSs BHF, BHT, GQD, KØGRM and TYY. North Dakota 75-Meter Phone Net report for December: 24 sessions, total check-ins 594, highest number check-ins 34, lowest 8; 138 pieces formal traffic, 66 informals, 37 relays. KØAZX is home from the hospital and taking it easy. OMA underwent surgery. The North Dakota Weather Net meets week days on 3845 kc. at 1330Z. Traffic: KØIVQ 400, RLF 165, ITP 149, WØMQA 122, KØTYY 122, GRM 38, WØBHT 34, KØPVH 29, MPH 28, WØGQD 25, KØTVI 25, WØPHC 23, KØDWX 13, KJR 13, RSA 13, WØAQR 10, KØGGL 10, GGI 8, TVH 8, TVM 7, AZX 6, WØDNJ 6, BHF 5, IHM 4, KØUPQ 2, WØAYJ 1.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN, SEC: SCT. Officers of the EMCARC for 1961 are KØLOW, pres.; KØVIZ, secy.; and KØVTP, treas. DSK, Milbank, reports a new daughter, born on Election Day. KØRPK received the General Class license, and KØALT the Technician. KØs YAA, AYW, ZKD and BRC, Brookings, lost beams during the ice storm at the end of November. Except for traffic reports, I'm receiving fewer items each month. Doesn't anyone ever do anything in South Dakota? SCT and ZWL made BPL in December. Traffic: WØSCT 720, ZWL 654, DVB 284, KØBMQ 210, AIE 75, HSW 54, WØOFP 37, CTZ 35, KØSEJ 24, VYY 20, WJT 17, DUR 14, PDW 13, DHA 12, TNM 12, ZMA 11, WØYVF 6, NNX 4, KØVIZ 4, INZ 3, RQY 3, BQR 2, WØFJZ 2, KØKOY 2, WØPAV 2, KØCXB 1, LXF 1.

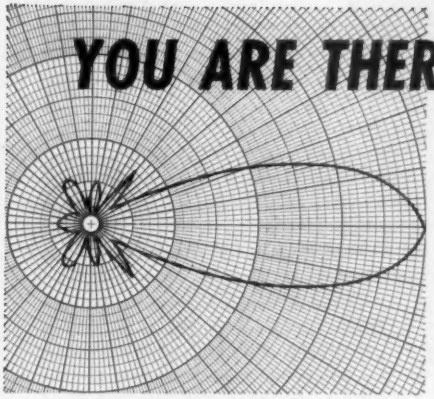
MINNESOTA—SCM, Mrs. Lydia S. Johnson, WØKJZ—Asst. SCM: Rollie O. Hall, ØLST. SEC: TUS. PAMs: OPX AND KØEPT. RMs: PET and KØIZD. New MJN member KØVTG is using a Valiant. RM RIQ resigned because of heavy work schedule. PET is the new RM for MSN. AREC member KØAKC has an HQ-170 receiver, a Globe Hibander TX-50 with a Hy-Gain five-element 6-meter beam. KNØAKM took his Gen. Class exam in St. Paul. He and KØUKU visited KJZ and worked their first DX on 10 meters. Four December BPL certificate winners are ISJ (his first), TUS, QDL and KØORK, with a high of 2041 points. That, I believe, is a record total for any single operator station in our section. A new YL is KNØZED, a college student from LaVerne. KØMAH resigned as EC. KØUKU received a Tenth Regional certificate and is using an EZ-Keyer built by KØOTH. KØPSE applied for OES appointment. MSN is holding two net sessions, at 0030 and 0345 GMT, to speed up delivery of traffic. VEIEG/Ø and KØIKL have a baby daughter. Joyce placed second in the YL Anniversary Party C.W. Contest; also has YLCC and YL WAS. The American Legion Minneapolis Post Office Post donated the funds for a complete station for the Veterans Hospital. The station call is BIV. DQL is the trustee, with three General Class and two Novice licensed operators on the staff. The equipment is s.s.b. HT-37 into a Viking Thunderbolt full kw., an SX-111 receiver, a DX-20, and complete antennas for all bands. At present on Fri., BIV is holding skeds with ISJ of Duluth. These skeds are for the purpose of allowing patients to talk with their families. Those of you who want to participate in other cities in our State, please contact DQL. OOs LST and KØJCF listed eleven violations. PAMs OPX and KØEPT accepted PAM appointments for another year. Traffic (Dec.) KØORK 2041, WØTUS 1334, ISJ 515, PET 381, KJZ 250, QDL 159, KØQBI 138, SNG 136, QLM 117, UKU 108, WØHEN 103, KØEPT 73, WØOPX 70, RIQ 63, WMA 60, KLG 53, KYG 51, KØPML 49, WØVPO 49, LST 42, KØZKK 42, KCF 40, MGT 37, SBB 35, WØBUO 31, FGP 30, UMX 30, KØIZD 28, WØQDP 26, KFN 25, KØSNC 24, KNØAKM 22, KØLWK 22, WØNYM 20, KØOBP 20, WØTHY 20, KØJYJ 17, IKU 14, VXW 9, WØWVT 9, KØUKL 8, WYV 8, KYK 7, WØDYC 6, KØVPJ 5, GKI 4, WØHNV 4, SZJ 3, KØVTG 3. (Nov.) KØIZD 1. (Oct.) KØIZD 31.

DELTA DIVISION

ARKANSAS—SCM, Daniel B. Patterson, W5SMN—SEC: K5CIR. PAM: DYL. Our congratulations to K5USE on having an RN5 certificate issued to him. Honorable mention should go to the Graveyard Net for its effort in trying to close the net at 0600, at which time the Arkansas Emergency Phone Net meets on the same frequency. The Arkansas Emergency Net members have tried to refrain from tuning up on the frequency before 0600. Activity in the C.W. Net is up to par and the usual holiday traffic found its way in and out of the net. Regular participation from OZK is maintained daily to RN5 by 8ZJ, USE, GXR or TYW. Some Russian DX has been heard on the lower end of 75 meters between 0300 and 0600. ABE takes the hot seat when he hams. These cold mornings he sits on a heat pad to keep warm! Traffic: W5SZJ 186, K5TYW 93, GXR 44, CIR 34, W5HC 16, K5UEK 14, W5SMN 10, K5ABE 9, W5ZZY 4, FPF 3, K5MEB 2, VRB 2.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Beams and towers, quads and miscellaneous antennas were lost by K5EFS, GFZ, K5USU, K5WSR, DP, K5YAB, K5KLN, KKZ, KN5GGH, K5YMY and NUH during the recent blow that passed through Southeast Louisiana. K5SGJ spent a busy week repairing most of the above antennas. His XYL, K5SGK, gave him a 'scope for Christmas. K5WSR is sporting a brand-new linear. K5USO is the new director of the Dixie Early Birds Net. NUH held the job until recently. Congrats to K5YCH on his General Class ticket. GKT, PAM and net control for the Delta 75 Net, logged 651 stations during December. CEZ reports that new stations have been reporting in on the LAN. Having acquired a Model 15, he expects to be on RTTY soon. MXQ, our SEC, recently made a trip to the New Iberia Club. K5USO and MXQ have been appointed by the

(*Continued on page 94*)



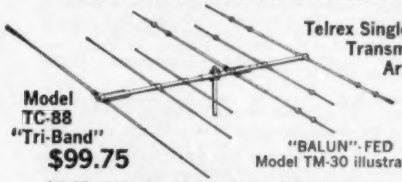
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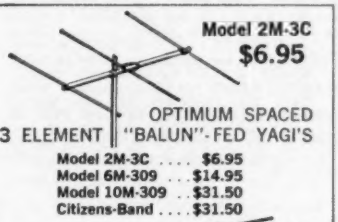
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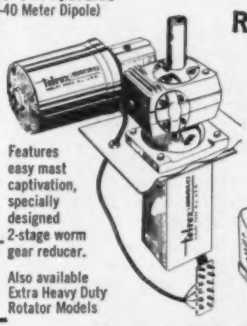


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FOR 144-174 MC BAND

STYLE 85 — includes ball mount through which cable passes for protection. Available in 3 ranges: 144 thru 154, 155 thru 164 and 165 thru 174. Overall length 53¼"; for cowl or bumper level mounting.

85-1 for 144-155 mc
85-2 for 155-165 mc } 25.50
85-3 for 165-174 mc

STYLE 100 — *Base Spring optional for use with Style 85 antenna. Design allows passage of coax through spring.* 4.50

STYLE 56 — same antenna as above but furnished with ⅜-24 threaded base ferrule. May be used with standard ball mount and spring. Overall length, 50¾".

56-1 for 144-155 mc
56-2 for 155-165 mc } 18.75
56-3 for 165-174 mc

FOR 450 MC BAND

STYLE 45 — roof top antenna extends 19 inches above the surface. Mount furnished requires ⅞" hole.

45 for 440-470 mc—20.00

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Greater N.O. ARC as members from that club to the Area Club Council. Other clubs in the area will do likewise in preparation of a joint project for holding a Delta Division Convention in 1962. K5PGV is now NCS for LAN. The New Iberia Club is going strong after recent organization. K5REN and K5VVN are new 75-meter mobiles. Code classes are being held and five new hams are in the making. TL is on the air s.s.b. with an HT-32A and an HQ-170A. UQR has been very active on 6 meters. A new 6-meter net for the area north of Lake Ponchatrain met initially on Jan. 1 at 2000 CST on 50.4 Mc. Those checking in were UQR, EWW, IVI, K5RFC and MHH. The net will meet each Sun. at 2000 CST on 50.4 Mc. 6-meter stations in Slidel are K5SLW, K5KAT, ANA and K5ZQU, all Heath Sixer users. Traffic: W5CEZ 488, MXQ 260, W4LDM/4 188, K5UYL 89, W5GKT 32, K5MVN 21, CZV 20, QXV 20.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—KN5FSP is on now with a Globe Chief from Columbia. K5YTA is working 6 through 80 meters from Tupelo. K5AFP reports that he still is active in Greenwood. SMX has gotten back on with an HT-32 and an SX-111. Glad to hear you, Leo. UOO has been heard on s.s.b. recently. It seems that DEJ has switched to s.s.b. CKY reports that DX is following the sun-spot cycle. Let me have reports from you DX bugs on your activity in the DX Contest. K5QLS reports that he is returning to this country. Welcome back, Bob. Just had a report from Director W4RRV on the past year. Keep it up, De. The Magnolia Net handled 96 pieces of formal and 283 pieces of informal traffic in December. Traffic: K5RUO 182, SQS 46, W5RIM 29.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—SEC: K4OUK. RM: FX. PAMs: PAH and UOT. Welcome to new traffic-reporters, W4s HSR, WXH, YRM, K4s RTA, CSY, FJR. Five stations earned BPL certificates: W4s PL, OGG, K4s AKP, AMC, FNR. New club officers: Mid-South, Memphis—DCH, FRB, K4-TYH, FZJ, Navy Club, Memphis—RHR, OPA, KN4-OUF. McCallie School, Chattanooga—K9UDV. UVU has amateur TV working on a closed circuit but hopes to get on the air soon. K4CSY is building a grounded-grid 1625 amplifier. YRM lists new equipment: A Globe Scout Deluxe and a 6-2 V.F.O. Thanks for the following reports: Net—FX, PAH, UOT, OES—YRM, OO—TDZ and K4RIN. New appointments: TDW as OBS; ZJY as OO; K4MIL as EC. Appointments renewed: K4AMC as ORS; K4RIN as OO. Traffic: (Dec.) K4AKP 2222, W4PL 1128, OGG 949, ZJY 406, K4FNR 381, AMC 258, BWS 240, W4FX 205, HSR 157, PQP 142, VJ 133, WXH 122, K4RTA 108, OUK 104, CSY 82, W4-TZG 46, K4YFC 34, W4UIO 32, PFP 26, TZB 21, K4FJR 20, W4TYV 19, UVL 17, YRM 14, PAH 12, RRV 9, UVU 8. (Nov.) K4BWS 30.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, 4CDA. SEC: BAZ. RM: K4KWQ. PAMs: SZB and K4OZI. V.H.F. PAM: K4LOA. Welcome to K4KWQ as the new RM for Kentucky. Fontaine has been assisting K4CSH for some time and doing an excellent job. Your support to KYN and KWQ is urged. Thanks to Al for his efforts. He will continue to be active on our section nets. ADH is working toward a new 50-Mc receiver and an s.s.b. rig. K4DFO is sweating out college applications. New General Class licensees in Louisville are K4NJX and FXN. BPL cards went to K4PGH, K4KWQ and BAZ for December traffic. BAZ reports the new Pacemaker is most gratifying on c.w. K4MZW has a new G-43 receiver and a Johnston bug. The 6-Meter MARS Net is very active with good state coverage. Owensboro has ten amateurs active on 6 meters. The Owensboro ARC has received a school bus contributed by Daviess County and conversion to an emergency communication center is well under way. Equipment for 4 Mc., 50 Mc., the Citizens Band and the local police have been obtained. There are two 2.5-kw. power units included. K4ZQR reports 6 meters in Louisville is rapidly growing. Danville has a new club with 17 members. K4QFE is president. K4TVC is ready for the CD Parties with new 40- and 20-meter antennas. KYN's traffic was 503 for December. BAS, JBC, K4DFL, LMS and OZG are new on MKPN. K4CWF is new in Fulton from Alabama. Father JDU, son K4QDD and XYL K4LDE seem to be the most amateur-minded family in Kentucky. OO reports were received from K4ZQR. DFO and ZRA. Traffic: K4PGH 644, KWQ 575, QCQ 256, W4BAZ 208, K4CSH 136, SFD 95, W4SUD 54, CDA 45, K4MZW 39, LOA 31, JLX 28, OLT 25, W4RNF 21, SZB 18, K4VDO 17, ZRA 16, W4ADH 14, K4DFO 12, ZQR 12, W4KJP 9, K4ZBA 9, W4VJV 8, K4MDS 7, W4WVU 4, K4VDN 3, TVC 2.

(Continued on page 96)

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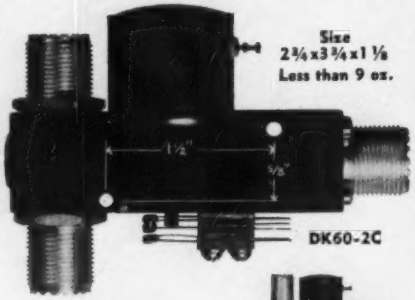
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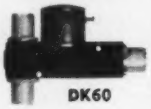
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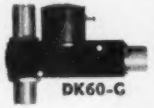
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MICHIGAN—SCM, Ralph P. Thetreau, W8FX. SEC. YAN. RMs: SCW, OCC, QQO and FWQ. PAMs. AQA, K8CKD, K8JUG and ATB. V.H.F. PAMs. NOH and PT. EC appointments went to K8PVC, UCG and UOQ; ORS to ELW, QQO, SCW, SJF and WXO; OPS to AQA, ATB, FSZ, K8JED and K8KVM; OBS to UOQ; OES to K8AEM and K8GIV. FSZ reminds us that the time for the Cosmo Calkins Award is here, the award likely to be made at the Bay City Convention Mar. 24-25. The Grand Rapids Convention will be held at Pantlund, Apr. 28-29. New club officers: Saginaw Valley ARA—K8GOU, pres.; K8IIB, vice-pres.; EOS, secy.; LNE, treas.; CTY, trustee. Copper Country RAA—IQA, pres.; K8UYX, vice-pres.; KN8VDT, secy.; K8UKW, treas.; GOW, act. Mason Co. RC—K8PVC, pres.; K8BNK, vice-pres.; K8JED, secy.; K8DIX, treas.; K8CKD, act. Grand Rapids ARA—OIY, pres.; UBF, vice-pres.; K8KCD, secy.; K8OEG, treas.—Tawas RC AMS—pres.; K8LPH, secy-treas. The SEC, YAN, reports the following ECs did good reporting jobs in 1960: ELR, QFQ, ALG, K8CIS, SLV, DTZ, UOQ, RHD, TOX, EMD, K8EXV and UTE. Congrats, those Form 5 reports are important. GZF sends in a swell write-up of OT AMS in the *Tawas Herald* of Dec. 21. KN8WXW sends in a good write-up of K8ATS in the *Adrian Daily Telegram* of Dec. 21. JTQ put up two 60-ft. towers. BPLers: RTN, EU and K8KMQ. Many just missed. NOH works KL7DEF and KL7CED on 50.01 Mc. ZHB went to the VA Hospital for cataract operations. Luck! WXO finally reports. K8JED is chairman for the hams Michigan Week. K8KVV got a TO keyer for Christmas. K8PSV has trouble with the 10-meter beam. K8KCO finished a new console for his 2-kw. p.e.p. s.s.b. EMD moved but keeps on with OO work. TIC is back from Florida. K8HLR wants to start a teen-age traffic net on 40 meters. OES reports were received from K8BGZ, K8NEY, NOH, K8PBA and PT. Bulletins also came from Lansing and Port Huron. A nice U.P. report came from Asst. Director W8CQU. QQK got a 1940 QMN rock—from ol' FX. Traffic: (Dec.) K8OTJ 407, W8FDO 316, OCC 292, K8GWZ 257, NEY 245, W8RTN 244, FWQ 203, EU 192, K8KMQ 182, LZF 180, W8NOH 155, K8MEG 154, EXE 109, NHC 88, W8QQO 65, JKX 62, AUD 61, FX 58, K8DJQ 48, W8ZHB 48, K8BZL 45, W8ILP 44, OQN 42, K8HLR 41, W8YAN 41, CQU 39, TBP 34, K8GJD 33, W8HKT 27, K8NAW 26, DQJ 24, IUZ 23, W8IXJ 23, EGI 21, JTQ 18, WXO 16, SWF 15, K8JED 14, W8SCW 14, K8KVV 12, AEM 10, KIT 10, W8BEZ 9, K8PSV 9, CKD 8, W8THZ 7, QIX 5, K8TJH 5, BGZ 4, W8ELW 2, K8KCO 2. (Nov.) W8JTQ 45, K8OTJ 25, ABW 14, AEM 12, LPV 9, W8AHV 4, QBA 4.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE. SEC: HNP RMs: DAE and VTP. PAM: HZJ. The 1961 officers elected by the West Park Radiops Club of Cleveland are IDM, pres.; AJW, vice-pres.; GMK, secy.-treas.; BDZ and ZEU, trustees. The Columbus ARA's *Carascope* tells us the 1961 officers are K8LXR, pres.; RRJ, vice-pres.; K8DJM, secy.; Mr. Willis, treas.; and THX, JSU, K8s IXY and JSF, directors. The club held its Annual Christmas Party. K8MTI was promoted to the rank of Eagle Scout. Massillon ARC's *MARC News* informs us that JHD spoke on "Unidentified Flying Objects" at the club meeting. Lancaster and Fairfield County ARC had a film on radio theory and also held its annual potluck family dinner. Toledo's *Ham Shack Gossip* names K8BAT as its "Ham of the Month". Oregon City RC received K8WNI as its station call. K8OTN is mobile on 6 meters. Toledo Mobile RA's 1961 officers are WIT, pres.; HYE, vice-pres.; and K8OFW, secy.-treas. K8KDT is home from the hospital. K8KXV is now married. K8LFG received his General Class license. The writer was in the Crile VA Hospital station, K8UZW, when it participated in the opening of the Veterans Administration Hospital Net, which will meet on Tue. and Thurs. between 1300 and 1500 on the 40- and 20-meter phone bands. We were given the news by Springfield ARC's *Q-5* that K8WQE received his General Class license and the stork brought K8NVS a baby boy. Canton ARC's 1961 officers are YAB, pres.; OJW, vice-pres.; OYV secy.-treas.; and FSM, IKM, LDR and K8EML, directors. More than a hundred amateurs toured the Timken Roller Bearing Plant's electronic department. The stork brought a baby girl to MJC and a baby boy to K8MPV. OSV has a new 100V. K8JSQ has been appointed Radio Officer for the newly-formed Erie County Civil Defense unit. FVC has Heath mobile twins now. K8WLP is a new Technician. The Findlay RS's *The W8FT News* tells us that FWL has joined Silent Keys. New members in the Knuckleheads are TJC, K8PER, K8PXV and KØZWU. Parma RC's 1961 officers are CZM, pres.; K8IIU, vice-pres.; K8DHX, secy.; and K8BQY, treas. JIA is in F-Land with the Navy. K8DHJ is in Florida waiting to go to Naval Radio School. K8DVJ is on the way to Guam with the

(*Continued on page 98*)

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ELECTRONIC LABORATORY

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Navy. K8ONQ ras a new Heath Sixer for mobile. NOY moved to Florida. VYU and K8GZT were home for Christmas. NEB has a new keyer. The Seneca RC showed the Ohio Bell film, "Hemo the Magnificent." The Ohio State U. RC meets at 1930 Thurs. in Building 26, River Road Dorms, and welcomes all O.S.U. amateurs to attend meetings. BZX, DAE, UPH and ZYU made BPL in December. Appointments made in December were BIF as OO, HFK as OES and K8LMI as EC. There are many who are sending in their appointment certificates for yearly endorsement and I want to thank you. Any of you whose certificates need endorsement should send them in at once. Traffic: (Dec.) W8UPH 1649, DAE 1261, ZYU 495, BZX 473, K8TZO 206, ONQ 196, W8SZU 160, K8LUP 112, W8LZE 95, K8OTO 77, W8IBX 65, CXM 61, K8MYG 57, W8YGR 57, OUU 29, K8BNL 11, W8LT 11, QCU 11, DG 8, WYS 8, K8MMO 7, W8WE 7, AL 6, K8KHH 6, MLN 6, EKG 4, HTM 4, W8EEQ 3, K8GSK 2, W8OSV 2. (Nov.) W8BZX 196, YGR 48, LZE 30; K8MFY 27, W8CXM 22, OUU 8.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: W2PHX. PAMs: W2IJG and W2NOC. Section nets: NYS on 3615 kc. at 1900; NYSPTEN on 3925 kc. at 1800; ESS on 3590 kc. at 1830; IPN on 3980 kc. at 1600; ENY (emerg.) on 29.490 Mc. (Thurs.) and 145.35 (Fri.) at 2100; MHT (Novice) on 3716 kc. Sat. at 1300. Appointment: W2ECU as OO. Congratulations to K2UTV and W2APF on making BPL during the holiday traffic season. It was nice to hear K2DEM, K2UTV, K2YZI and WA2ALO home from college and on the nets. WA2PDS is a new 2-meter station in Poughkeepsie and WA2OWX is on 6 meters in Liebhardt. K2BGU reports a new Seneca and an Eico modulator with a D-104. A new 220-Mc. converter is the next project. The Yonkers and Albany Clubs reported well-attended Christmas Parties. K2IOM appears to be in demand as an auctioneer. W2QAI and K2BFU were off the air with receiver troubles but now are back on. Yonkers is preparing for the Fall 1961 Hamfest, according to K2BIG. Club crystal banks for Novices and net operations are becoming popular. Has your club tried it yet? W2SZ, the RPI Club, is moving to new quarters on the campus. WV2-NRB received a Certificate of Merit from the American Red Cross for saving a life during Hurricane Donna. Congratulations. Other stations heard during the holidays were K2YRC, K2TQJ, K2JWM, K2COI, K2ZDJ and K2CPF. Living in the same dorm, K2JWM finally got an overdue card from 4X4JH, now studying in this country. Those sporting new receivers are WA2JZH and WA2IDEK. Traffic: K2UTV 1558, W2APF 545, K2-MBU 250, W2THC 148, K2DEM 139, W2EFU 97, K2-TMC 20, WA2HGB 17, W2URP 9, K2HNW 8, WA2-ALO 6, K2VCZ 5, WA2FLA 3, W2GTB 2.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannals, W2TUK—SEC: W2ADO. RM: W2-GXC. PAM: W2UGF. V.H.F. PAM: W2EW. The holiday season traffic boom was tremendous with eight of our section's traffic-handlers earning BPL cards, all the hard way with 500-plus points. Congratulations to K2UAT, K2UBG, W2EW, K2UFT, WA2GPT, K2RBW, WA2FBC and K2UYW. Both K2UAT and K2UBG topped 1000 for the first time while W2EW earned his ninth 1960 BPL, almost exclusively on the V.H.F. Net. Several comments have been received relative to QRM on nets—AREC, RACES and traffic. It would seem that these groups which are actively engaged in a form of public service operation should be afforded clear frequencies for their short periods of operation. Your cooperation in this matter would be greatly appreciated by the busy control stations who are trying to maintain order. W2LDC, W2OKU and K2OVN journeyed to ARRL Hq. for a pleasant visit. New officers of the Multiband Amateur Radio Club (MARC) are K2TWM, pres., WA2GRA, vice-pres.; K2RYI, secy.-treas.; W2NUY, act. mgr. The Mid-Island Six Meter Net is now handling traffic. Ex-WA2AFX now signs K1QIM from Maine. New officers of the Staten Island ARA are W2EUY, pres.; K2OEI, rec. secy.; W2VKF, corr. secy.; and K2EFB, treas. K2RHG is working on 420-Mc. gear. The Bayside ARC Net shifted from 10- to 75-meter phone. W2KGO, W2MY, W2SKX, W2TUK, WV2NZR, WV2NWJ, WV2ONR, WV2PQR and other Naval Reservists flew to Washington, D. C., to visit NSS, Radio Washington. New officers of the Grumman ARC are WA2FWV, pres.; W2MVX, vice-pres.; WV2KST, secy.; and K2KSP, treas. It is with deep regret that I announce that W2ZPQ and W2FWK are now Silent Keys. The newly-formed North Bellerose RC has elected WA2KYF, pres.; K2IVE, vice-pres.; and WA2MPP, secy.-treas. K2EFB and K2OEI have converted ASB-5 rigs for 420-Mc. operation. K2UYG received the First

(*Continued on page 100*)

INTERNATIONAL 1961 CATALOG



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Class Operator's Club certificate. New officers of the Larkfield ARC are K2HTX, pres.; and WA2GMB, secy. WA2GPT has added a new SX-101 MKIII to the station. W2GXC, RM, is looking for NLI assistance in New York City, Brooklyn and Queens. WA2CZG has been award-hunting. WA2KWZ is enjoying his newly-acquired General Class license with his DX-100, HQ-170 and TA-33JR. New officers of the Mid-Island RC are K2AZT, pres.; W2SMQ, vice-pres.; W2WFL, secy.; and W2CLG, treas. W2OBU put up new antennas for 10, 15 and 20 meters for the DX Contest. WA2NWG received RCC. K2MEM built a Heath Tenner for mobile work. New officers of the Lake Success RC are W2IDB, pres.; K2JTW, vice-pres.; and K2CMV, secy.-treas. A new rotator at W2UAL helps to improve 2-meter operation. K2IBJ has completed a handie-talkie for 144 Mc. The New York Contest Club has been formed with W2JGU, K2OFD and K2RHD as board of directors. K2UTN announces that he is offering a WAS V.H.F. cup for the first applicant who works all 50 states on v.h.f. s.s.b. Rusty is now using 813s in linear operation with his S/Line. New officers of the Amateur U.H.F. club are W2MNX, pres.; WA2CXN, vice-pres.; K2UCU, rec. secy.; W2QPQ, corr. secy.; and K2BBO, treas. New officers of the Levittown ARC are K2SDM, pres.; W2LPC, vice-pres.; K2IHQ, secy.; K2YHD, treas.; K2IWX, sgt.-at-arms and W2RZH, trustee. Traffic: (Dec.) K2UAT 1292, K2UBG 1027, W2EW 736, K2UFT 727, WA2GPT 686, K2RBW 619, WA2FBC 561, K2UYW 532, W2GXC 293, W2GKZ 209, W2WFL 139, WA2EFN 76, WA2CZG 74, K2CMJ 72, K2BH 71, K2-THY 63, K2DNY 53, WA2IDC 53, K2PHF 52, K2OFD 41, W2OKU 38, W2DBQ 26, W2JBQ 20, WA2KWZ 10, K2OEI 15, W2PF 15, K2QBW 14, W2AEE 13, K2AZT 10, K2SJP 10, K2YQK 10, K2RHG 7, W2MDM 6, W2GP 5, WA2NWG 4, W2OBU 4, W2SEU 3, W2TUK 2, K2-MEM 1. (Nov.) W2UGF 29, K2UTN 12.

NORTHERN NEW JERSEY—SCM, J. Sparks Remeczky, K2MFF—SEC: WA2APY. RM: K2VNL. PAM: K2SLG. V.H.F. PAM: K2KVR. Section nets: NJN daily at 0000 GMT on 3695 kc., NJPN Mon. through Sat. at 2300 GMT and Sun. at 1400 GMT on 3900 kc., N.J. 6 & 2 at 0400 GMT Thurs. and Sun. on 51.15 Mc. and at 0100 GMT Wed. and Sun. on 147.7 Mc. NJN reports 31 sessions, attendance 640 and traffic 699. NJPN reports 31 sessions, attendance 609 and traffic 179. NJ 6 & 2 reports 12 sessions, attendance 105 and traffic 101. WA2BNF, WA2CCF, WA2EJZ, WA2GQZ, K2UCY and K2VVL earned BPL cards in December. New appointees are WA2JGC as OES, WA2JHQ as OPS and WA2KKH as ORS. K2CBG acquired a KWM-2. K2IKZ is now attending the Rochester Institute of Technology. K2-YBC has such a long, long wire she needs a blinker on the far end to find it. K2VZJ received his WAS award. K2ULB's son passed the Novice Class exam. W2VMX is looking for contacts with fellow stamp-collectors. K2SMV received an HQ-110 for Christmas. W2CVW bought a 75A-4. WA2EJZ received the WAYLARC certificate. WA2ILB wants to play chess over the air. K2CEP visited W1AW. K2OQA is very close to DXCC. WA2BDP has a new Heath v.f.o. K2VVL added a KWM-2 and a 30S-1 recently. WA2IDM has now worked 113 countries. WA2GQI and GQZ bought an HQ-110 as a spare receiver. K2AGJ is giving code practice every day on 2 meters. WA2MNK has a new v.f.o. and a bug. W2BVE got his 2-meter gear working and sent out 46 QO notices in his spare (?) time. WA2CCF caught a bootlegger and received a commendation from the FCC. WA2OXT passed the General Class exam. Are *you* active on the bands above 50 Mc.? Are *you* experimenting or handling traffic on v.h.f. and u.h.f.? Are *you* willing to send monthly reports of your activities? If so, you probably qualify for an Official Experimental Station appointment. Let me know if you are interested, folks. Traffic: (Dec.) WA2GQZ 554, K2UCY 518, WA-2APY 367, K2VNL 363, WA2EJZ 316, WA2CCF 311, W2RXL 243, WA2KKH 222, WA2COO 210, WA2EQO 158, K2VVL 142, WA2MNK 135, WA2BNF 130, W2QNL 116, WA2EDG 114, W2EBG 75, K2MFF 75, K2KDQ 68, WA2CNV 59, W2CVW 52, W2BVE 44, W2DRV 44, WA2JHQ 39, WA2AKM 29, WA2GQI 19, K2AGJ 18, K2PQR 16, W2BSC 15, K2MFX 12, K2EQP 10, W2-CFB 8, W2ZVW 7, K2JRJ 6, WA2DPT 5, K2GIF 4, W2VMX 4, W2NIY 3, W2EWZ 2. (Nov.) K2CBG 26, WA2ILB 10. (Oct.) K2VVL 140.

MIDWEST DIVISION

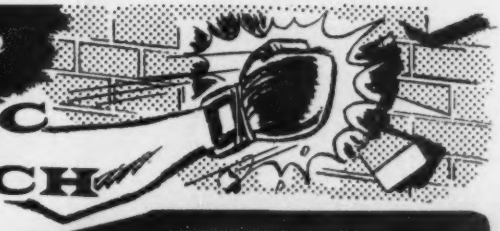
IOWA—SCM, Russell B. Marquis, WØBDR—Asst. SCM: Walter G. Porter, ØUJC. SEC: KØEXN. PAM: KØMFX. RM: PZO. The Iowa 75-Meter Phone Net reports 27 sessions with 1354 QNS and 319 ATC. For the 160-Meter Phone Net: 31 sessions with 667 QNX and 53 QTC. NWX checked into the TLCN from VP2-VA. KØOFI was appointed EC for Webster County.

(*Continued on page 102*)

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NTI and HTP are vacationing in California. FMX is in Texas. DUA received a DXCC certificate. QVZ has reached 200 countries worked and confirmed on two-way s.s.b. LJW and KØAUU made the BPL on originations and deliveries. KØCLS/6 visited several Iowa hams. KØSEW and OAH have moved to Arizona. KØEXN reports a very satisfactory increase in AREC activity. Ron has moved to Spencer. KØSLY also is visiting in California. ICH has his General Class ticket. SCA, LGG and BDR made BPL every month in 1960. UCE was home on leave from the Navy. NGS has moved into Dayton. KØVDY has a 5-watt 6-meter mobile rig. Traffic: (Dec.) WØLGG 3512, LCX 2595, SCA 2508, BDR 2275, DUA 637, PZO 529, KØHBD 281, AUU 212, WØLJW 177, NTB 120, QVA 46, BLH 33, KØKAQ 32, WØIO 23, GQ 22, KØGOT 20, MFX 17, YLN 14, WØQVZ 13, YDV 13, KØVSV 12, WØYOZ 12, KØIHC 11, WØUHO 10, PTL 9, KØVKT 9, WVK 9, WØPJI 6, KØBRE 5, EJN 5, WØEEG 2, KØGXP 2, OFK 2, WØNWX 1. (Nov.) WØJPJ 18, KØGXP 5, KBX 2.

KANSAS—SCM, Raymond E. Baker, WØFNS—SEC: VZM. Asst. SEC: LOW. RM: QGG, PAM: ONF. V.H.F. PAM: HAJ. Section nets: KPN, 3920 kc. Mon., Wed., Fri., at 0645, Sun. at 0800, NCSs KØQKS, EFL, IZM and WØFHU. QKS, 3610 kc. daily at 1830, NCSs WØSAF, TOL, QGG and KØBXF. Area Net HBN, 7280 kc. Mon. through Fri. at 1200, KØHGI as mgr. The Newton ARC elected KØPFM, pres.; PHS, vice-pres.; PHI, secy.-treas. The Wichita ARC elected KØJWS, pres.; RVI, vice-pres.; SMI, secy.; PIB, treas. The Jawhawk ARS elected KØJVR, pres.; WLB, vice-pres.; BXF, secy.; DVJ, treas.; KØTRG, CGS, WØCSL and DWZ, dir. The Southern KARC set up portable at the Boy Scout Exhibition and handled 32 messages. The club received the first prize blue ribbon for best in electronics. ONF, our PAM, is looking for contacts on 6 and 2 meters. KØJMF reports a dry run for the Topeka 2-meter weather gang because of high winds Nov. 27. Mobiles were UPU, ECQ, KKF, BXJ, OBO, WIZ, WXG, JMF and KXB. NI, KOL and CET were at the weather station. Traffic: (Dec.) WØOHJ 1457, KØHGI 1240, WØSAF 364, ABJ 246, KØBXF 227, WØBYV 206, FNS 194, QGG 160, IFR 116, TOL 98, KØUAX 78, IZM 75, WØBLI 64, KØHVG 60, QKS 47, TNW 40, JID 21, WØWFD 19, TSR 18, LOW 16, KØEFL 16, WØVZM 15, KØYRQ 11, WØFHU 7, KØQOB 4, UER 3, WØFDJ 1. (Nov.) KØYWT 16, WØBBO 13.

MISSOURI—SCM, C. O. Gosch, WØBUL—SEC: KØLTP. RMs: OUD and KØONK. PAMs: BVL and OVV. Net reports: (Dec.) MEN (3885 kc. 2400 GMT MWF) 13 sessions; QNI 359; QTC 175; NCSs OVV 6, BUL, KØONK 3, KØRPH. MON (3580 kc. 0100 GMT M-S) 27 sessions; QNI 170; QTC 238; NCSs: OUD 20, KIK 5, KØLGZ and MAU 1. SMN (3580 kc. 2200 GMT Su.) 3 sessions; QNI 12; QTC 14; NCSs: OUD 3. MSN (3715 kc. 2230 GMT M-F) 23 sessions; QNI 135; QTC 215; NCSs KØONK 6, VPH 8, VAY 5, YRQ 3, BXF 5. KØMAU reports receiving his net certificate for TEN. The initial traffic report from LII was received this month. The station is operated by ARO and is located at the site of WDAF/WDAF-TV (Kansas City). KØIHY reports contact with TG9HC on 75-meter phone. GBJ has finished his 144-Mc. rig and has it operating. KØJPL reports the following as officers of the Northwest St. Louis ARC (KØAXU): KØCRR, pres.; MNW, vice-pres.; KØJPL, secy.; RXG, treas.; WEQ, act. mgr. He also reports a new HQ-170 with resulting increase of DX contacts. KØOJC reports antenna difficulties. SWMARC, Inc., officers (Springfield) are reported as: KØJPJ, pres.; KØLTP, vice-pres.; KØUWT, secy.; KØVCD, treas.; KØLTK and KØVCD, bulletin. The editor of *MONKEY* and c.w. traffic manager for EEE (MSM RC, Rolla) sends a detailed report of activity. Membership is the largest in history; 50 Mc. activity is planned; the s.s.b. segment is very active; DX, under KØIFL, has added ten new countries; traffic is to be of increasing interest with the entire student body offered this service via EEE and the hours from 2300-0200 GMT set aside for this phase. The old record point score was smashed in the SS Contest with 95,630 points from 674 contacts. Traffic training and code practice is included along with moving the station to a new location on the campus. Traffic: (Dec.) KØONK 1303, MMR 274, WØMKJ 261, OUD 191, KØKBD 180, MAU 179, WØKIK 151, KØVPH 137, WØBVL 116, AYB 115, ZLN 114, ANT 99, WAP 85, OMM 60, KØWBD 53, WØBUL 45, KØRPH 40, WNZ 38, WØRTW 37, LII 34, OVV 34, KØPCK 33, IHY 28, WØPXE 27, KØVNB 13, JPL 12, WØARO 5, KØVTX 2. (Nov.) WØEEE 73. (Oct.) WØEEE 36. (Sept.) WØEEE 14.

NEBRASKA—SCM, Charles E. McNeel, WØEXP—

(Continued on page 104)



High power for outstanding AM-CW performance teamed with reduced power for CW enthusiasts

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For Peak Performance Power—here's a real Champion. This new bandswitching 10-160M transmitter operates 350wCW, 275w phone, 450wSSB (PEP) with 10-15w external exciter. TVI-suppressed. Built-in VFO. High level Class B modulation with new compression circuit. Pi-Net output, 48-300 ohms. Also built-in push-to-talk and antenna change-over relay. Final tubes fan air cooled. Single knob bandswitching. Entire unit self-contained in new-type ventilated cabinet. Size—12 x 21⅜ x 17"

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FT-241 lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC) . . . . . **50¢ ea.**
Pin spacing ½" Pin diameter .093
Matched pairs ± 15 cycles **$2.50** per pair
200 KC Crystals, **$2.00 ea.**; 455 KC Crystals, **$1.50 ea.**; 500 KC Crystals, **$1.50 ea.**; 100 KC Frequency Standard Crystals in HC6/U holders **$4.50 ea.**; Socket for FT-243 crystal **15¢ ea.**; Dual socket for FT-243 crystals, **15¢ ea.**; Sockets for MC-7 and FT-171 crystals **25¢ ea.**; Ceramic socket for HC6/U crystals **20¢ ea.**

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SEC: KØTSU. The Western Nebraska Emergency Net, KØRRL as NC, reports QNI 598, QTC 455 and 11 sessions. The Western Nebraska Net, NIK as NC, reports QNI 591, QTC 589, 100 per-cent check-in for December KØBMQ, DVB, NIK, OFP and PZH. This net held 314 sessions in 1960 with DVB missing only 4 and KØBMQ only 6 sessions; also total QNI for 1960 was 7914. The Nebraska Section C.W. Net, NYU as NC, reports 31 sessions QNI 281, QTC 237. The Nebraska PO Net, reported by KØKKJ, had QNI 435, QTC 58; also for November QNI 385, QTC 44. The Nebraska Emergency Phone Net, reported by ZOU, had QNI 575, QTC 51. KØTUH has a new QTH at Riverside Calif. New officers of the Fremont Amateur Radio Club are AKO, pres.; KØSCN, vice-pres.; KØRJE, secy.; FXH, act. mgr. New officers of the Lincoln MARS Club are KØHPT, pres.; KØMSE, vice-pres.; KØKXV, secy. Traffic: (Dec.) WØNIK 431, KØTUH 424, RRL 416, BMQ 360, BRS 333, WØRDN 234, KØQFK 229, WØNYU 184, KØYRQ 175, IJW 168, WØZJF 165, DDT 161, KØKJP 86, WØUWK 68, PZH 61, LFJ 60, KØWEP 60, CYN 48, OAL 48, WØEGQ 43, OKO 42, KØKTZ 34, WØAHB 33, AFG 27, KØRQE 27, WØVEA 26, OCU 23, RIH 23, KØELU 21, RAU 21, WØZOU 21, KØMSS 17, WØYFR 15, JDJ 12, KØKLB 8, WØHTA 8, HOP 7, KDW 6, KØKKJ 5, SLB 5, MZV 5, WØVZJ 4, WKP 4, KØWNH 4, WØERM 3, KØVAZ 3, WØTSU 2, KFX 1, SWG 1. (Nov.) KØYRQ 105, VIA 11, DVW 7.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., W1CHR—SEC: EOR. RM: KYQ. H.F. PAM: YBH. V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 1800, Sun. 1000 on 3880 kc.; CN daily 1845 and 2200 on 3640 kc; CVN, Mon., Wed. and Fri. 2030 on 145.98 Mc.; CTN, Sun. 0900 on 3640 kc. BDI is resuming construction projects anticipating the need for more power as sun spots get fewer. Apologies to Electronics Unlimited, Inc., for wrongly crediting the Manchester RC in the January column for the very successful electronic course the former group is running. Electronics instructors SKA, WZJ, EOR, QUJ and K1MIP are to be congratulated on their fine effort. Attendance at meetings has grown from about 47 to over 60. EFW is busy helping with *Nutmeg News*. K5OEA/1, K5SPD/1, K1AQE and KYQ made the BPL; K1LQD, K1LNA, AW, HJG and FHP did it with originations plus deliveries. CN handled 688 messages on both sessions with 554 on the first for an average of 17.8; 134 on the second for an average of 4.3. Attendance the first session averaged 9.3; 4.9 for the second. High QNI were RFJ, K1GGG and K5OEA/1. CPN handled 552 messages in 31 sessions for an average of 18. Daily attendance averaged 24. Honor roll for 80 per cent or higher attendance included FHP 31, K1AQE 30, K1BSB 30, YBH 30, DAV 28, TVU 26, VQH 26. K1KSH has his 1st-class phone ticket. FYF got a WVT certificate. K1HTV has a new 50-ft. tower. K5OEA/1, K5SPD/1 and NTH visited Hq. and then stopped to see YBH. ADW notes a drop in Danbury traffic with TYQ gone. Ex-DNJ now is WA6NVO in Inglewood, Calif. GVT is sporting a new Chevvy. ZZK is writing DX news for *Nutmeg News*. BGJ is on s.s.b. with a new HT-37. The CQRC elected K1AQE, pres.; K1BSB, vice-pres.; JSU, treas.; K1CFW, secy.; FHP, station and 2-year trustee; YNR and FPF, 1-year trustees. NJM announces a CWA code test to be held Mar. 20 at 0130Z (Mar. 19, 8:30 P.M.). APA now is on 20- and 40-meter s.s.b. with ½ kw. and a new quad. FHP says CVN held 12 sessions with 38 reporters and handled 163 messages. High QNI were FHP 12, HJG 10, JZA 10; new station CWF. K1HMU reports that the Yale RC is not too active but he is building a de luxe c.w. rig and hopes for revived interest. ABZ misses the gang on 3880 kc. but gets home too late to QNI. K1HJV reports the Mobileers were active during the Dec. 12 snowstorm. The RACES U.S. Regional 1 C.W. Net needs a couple of good men as alternates from Connecticut. For details contact PRT. Reports received: OO from K1LFS, K1IFJ, K1HTV, K1IVR and K1GUD; OES from HJG and FVV. Appointments renewed: FYF and K1ACC as OPSs; NJM as ORS; K1IFJ as OO; NJM as EC. Traffic: (Dec.) K5OEA/1, 1001, SPD/1 569, K1AQE 564, W1KYQ 488, AW 430, FHP 425, OBR 355, YBH 305, EFW 297, NJM 236, K1GGG 191, LNA 157, W1HJG 140, K1LQD 133, W1-NTH 95, K1HZT 82, W1CHR 69, RFJ 62, K1BSB 51, LAH 49, IVR 42, DGK 41, W1VIY 40, JZA 30, BDI 26, FYF 23, CTI 17, ADW 12, BNB 7, APA 5, CUH 4, HAX 3. (Nov.) W1ROX 20.

MAINE—SCM, Jeffrey I. Weinstein, W1JMN—V.h.f. activity, particularly on 6 and 2 meters, is on the increase. Portland has about 30 actives. We hope v.h.f. may gain in popularity in Maine, so contacts throughout the state on a regular basis paralleling all we do on

(*Continued on page 106*)



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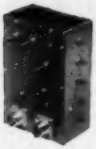
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Adapter panel for rack mounting	9.95
LPA-1 Amplifier—Factory wired and tested Complete with cabinet, blower and tubes	375.00

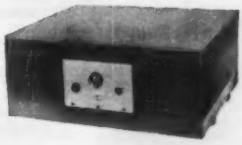
POWER SUPPLY KIT TOO

LPS-1 Kit—(complete with cabinet but less tubes)	$169.50
Adapter panel for rack mounting	9.95
LPS-1 Power Supply—Factory wired and tested Complete with cabinet and tubes	205.00

(See Nov. QST, page 115 and Nov. CQ, page 21, for outstanding features)



LPA-MU Matching Unit Price $36.00
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Factory wired and tested



LPS-1 Power Supply for LPA-1

Barker & Williamson, Inc.

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OTHER B&W EQUIPMENT: Transmitters AM-CW-SSB • Transistorized Power Converters and Inverters • Dip Meters • Matchmasters • Frequency Multipliers • Low Pass Filters • T-R Switches • R. F. Filament Chokes • Transmitting R. F. Plate Chokes • Band-Switching Pi-Network Inductors • Cyclometers • Antenna Coaxial Connectors Baluns • Variable Capacitors • Toroidal Transformers • Coaxial Switches • Fixed and Rotary edgewound Inductors • Plug-in Coils with fixed and variable links • Straight type air wound coils in a variety of dimensions.

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THE FIRST MULTIBAND COAXIAL ANTENNA for 6-10-15-20 Meters



needs no ground plane radials—

Ideal for . . .

Emergency nets and citizens band wherever omnidirectional coverage is desired.

Campers and apartment residents or *wherever* space is a problem.

A second antenna for low angle radiation.

The New C-4 features . . .

- Full electrical half waves on all bands . . . eliminating the need for awkward ground plane radials.
- Easy, inexpensive mounting with regular TV hardware such as simple chimney mount as shown.
- Compactness . . . only 12′ over-all height.
- End-loaded to provide maximum radiator current for maximum radiation.
- Quick installation . . . about ½ hour.
- Power rating . . . 300 watts AM.
- Feed line . . . RG58AU or equivalent.
- SWR . . . less than 1.5 to 1 at resonance.

Model C-4 amateur net **$34.95**

Two other 6-10-15-20 meter antennas:

Model B-24 Four Band Beam
Element length 11′ — boom length 5′
Turning radius 7′
amateur net **$54.95**

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Mobile • 5′-3″ high
Fits all standard mounts
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The above antennas are also available for 6-10 or citizens band operation.

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SPECIALISTS IN COMPACT ANTENNAS

lower frequencies will be possible. All Maine nets are now operating on a daily schedule, including the MSSN. Incidentally, net certificates will be available to all active members of the SGN, PTN and MSSN upon request through the respective net's PAM or RM. AREC members are urged to check their AREC membership cards to assure that they are valid. If endorsement is required, contact your area EC or acting SCM. The Bangor Area AREC-RACES organization and Maine's Departments of Labor and Education are, again this year, sponsoring classes in radio, electrical theory and code. Amateur operators in the Bangor area are cordially invited to attend these informative meetings. All traffic-handling amateurs are requested to report their traffic totals on the first of each month, whether by letter, card, or radiogram, for listing in *QST*. As of Jan. 20, 1961, Jeffrey I. Weinstein, W1JMN, has resigned as your SCM. He passes along his wishes for best success to his successor, who will be determined in the next election. Everyone interested should file nominating petitions with ARRL on or before June 16, 1961. The full legal notice soliciting SCM nominations and repeating that date will appear in April *QST*. Traffic: (Dec.) K1MJN 135, GSF 104, W1DLU 83, K1DUG 52, MZB 39, GVQ 34, W1GRG 32, K1OAZ 31, EFZ 27, DYG 26, JNN 15, IAA 14, W1EFR 11, JMN 10, OTQ 9, K1MBM 7, KN1OJH 7, K1BYE 6.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—SEC: AOG. New appointments: EYK Harwich as EC, DFS as OO. TZ had a heart attack but is coming along slowly. Sorry to have to report that DLT, of the FCC Office in Boston, is a Silent Key. K1GKA is active in the 6-Meter Crossband Net. Thanks to all for the many Christmas cards received. IHC is back after a tour in the Army. K1PFS is active on 6 meters and in the net. The QRA held its Christmas Party. VRK and his YL are engaged. KN1-NNN lives in Norwell and is on 2 meters. Heard on 2 meters: K1s HDY, PNO, HBM, NNK, KN1s NTU, OLJ and DOF. K1QJU is on 10 meters. KN1PQG is in Avon. AWA has a new HQ-180. K1NKW is on 15 meters. Quite often fellows ask for new call of someone who used to live in this section, so here are a few of them: W4WZ is ex-1VA, K4BQ is ex-1CPD, 6JUT is ex-1DVC, K6AVF is ex-1KCP, WA6CQF is ex-1AJU, K6GX is ex-1WE. The last we heard of KBS he was in Florida. Heard on 75 meters: SUS, FJI, LIN, LHT, QEY, LOS, TQS, BPW, ABA, SZB, ZWQ, ZTI, BJX, KLO, K1s JUQ, JXU, NPV, JX8, NGJ, IDA, AMP, JKV, MMC, ODB, OUO, KHT, GUG, CUH, K9QPL/1 and K6RHN. BIO is not on the air very much. K1DSA has the call W1SWX up in Maine. K1KTK is on 6 meters and has the APX-6 converted for 1215 Mc. K1MOJ is on several bands. UIR is working on a rig for 220 Mc. AHE writes that he has been home ill since the end of October but now is doing a little building. NF says he heard Danny on Clipperton but didn't work him. RGX is in the hospital. PEX is doing some business traveling. OFK, our Somerville EC, advises that three drills were held. QMN and 2BVU are mobile on 2 meters. DOM is a new OPS. K1PFS has a Hi-Bander transmitter. AUQ is busy with OO work. K1-HBM has a home-brew rotator for a three-element, 10-meter beam and a 15-meter dipole. RCQ has a three-element three-band beam 55 feet up. His total now is 189. K1MHC has a 522 on 6 meters. K1BUF has a Tener. K1JAW worked 300 in 36 sections for 40,000 points in the SS. K1AMP and MBA have Teners mobile. FQA has a new Ranger. K1MEM has a new mike and is putting up a 65-ft. tower. K1KUY has a converter for mobile on 6 meters. Mrs. Tracy Cole had a rig on 6 meters while in the hospital. Appointments endorsed: IHC, K1s AII and IWP as OESs; EMG as ORS. Former fellows from this section heard on 75 meters up in New Hampshire: LWI, JLK and MZE. WA6CQF sends his regards to all the gang. K1s GNR, LLX, PFS, W1TWG and EMG made BPL. LMZ has been endorsed as OBS. New officers of the Wellesley Amateur Radio Society are K1BEC, pres.; K1DAT, vice-pres.; EJE, treas.; K1IOG, secy. K1AII is working on both paper-strip and tape-recording equipment. Our 2-meter net held 29 sessions with 406 stations and 562 pieces of traffic handled. RYB and K1IMU are on 75 meters. AKN is very active in MARS nets. The Yankee Radio Club held an "Old Timers Night." ZBT has two 150-ft. towers with a 64-element beam for 2 meters. K1MVN has been helping him. KIJIL made WAC. K1MPB is on 15 meters. K1KPD made a vertical antenna for 10 meters. BHD has been endorsed as OBS and OES. VRK says that the dates for the New England Convention are Apr. 8 and 9. The King Philip ARC of Sudbury has an active number of v.h.f. experimenters. The latest project is a "poor man's" lard-can paramp. for 144 Mc. What has happened to some of the clubs? No news has been received for some time from New Bedford and Lawrence. The Norfolk County Radio Assn., one of the oldest clubs affiliated with ARRL, recently celebrated

(Continued on page 108)

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CITIZENS BAND TRANSCEIVER

that meets FCC regulations*

*EICO premounts, prewires, prelunes, and seals the ENTIRE transmitter oscillator circuit to conform with FCC regulations (Section 19.71 subdivision d). EICO thus gives you the transceiver in kit form that you can build and put on the air without the supervision of a Commercial Radio-Telephone Licensee!



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#761: 117 VAC & 6 VDC
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incl. mtg. bracket (Pat. Pend.)

Kit $69.95 Wired $99.95

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Highly sensitive, selective SUPERHET (not regenerative) receiver with 5½ dual function tubes and RF stage. Continuous tuning over all 23 bands. Exclusive Super-Hush® noise limiter. AVC. 3" x 5" PM speaker. Detachable ceramic mike. 5 Watt xtal-controlled transmitter. Variable "pi" network matches most popular antennas. 12-position Posi-Lock® mounting bracket. 7 tubes and 1 xtal (extra xtals available). Covers up to 20 miles. License available to any citizen over 18 — no exams or special skills required; application form supplied free. Antennas optional.

Additional crystals $3.95 each.

Most EICO distributors offer budget terms.

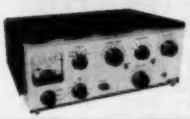


NEW! 60-WATT CW TRANSMITTER #723
Kit $49.95 Wired $79.95
Ideal for novice or advanced ham needing low-power, stand-by rig. 60W CW, 50W external plate modulation. 80 through 10 meters.



COLOR & MONO DC-5MC LAB & TV 5" OSCILLOSCOPE #460
Kit $79.95 Wired $129.50

5" PUSH-PULL OSCILLOSCOPE #425 Kit $44.95 Wired $79.95

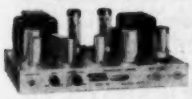


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"Top quality" — ELECTRONIC KITS GUIDE. Ideal for veteran or novice. 90W CW, 65W external plate modulation. 80 through 10 meters.



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VACUUM TUBE VOLTMETER #221
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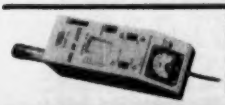


HIGH-LEVEL UNIVERSAL MODULATOR-DRIVER #730
Kit $49.95 Wired $79.95
Delivers 50W undistorted audio. Modulates transmitters having RF inputs up to 100W. Unique over-modulation indicator. Cover E-5 $4.50.

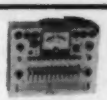


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TV-FM SWEEP GENERATOR & MARKER #368
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Kit $29.95 Wired $49.95
Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.



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Q5-3

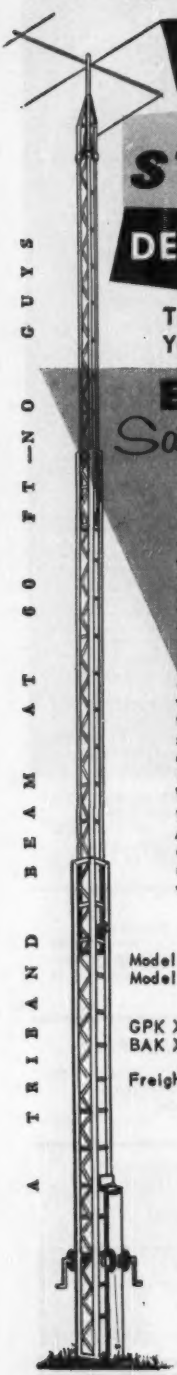
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STRENGTH is built-in to every E-Z Way Tower...Heavy wall steel tubing legs, continuous diagonal bracing of solid steel rod and electrically welded throughout...no loose bolts or nuts here. E-Z Way design and strength are your assurance of DEPENDABILITY that you can count on year after year. See your nearest distributor today or write for free literature.

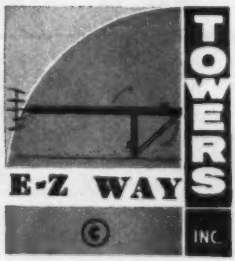
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Model RBX-60-3P (Painted)	$335.00
Model RBX-60-3G (Galvanized)	$410.00

MOUNTING KITS:

GPK X60-3 (Ground Post)	$125.00
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Freight Prepaid anywhere in (48) U.S.A.



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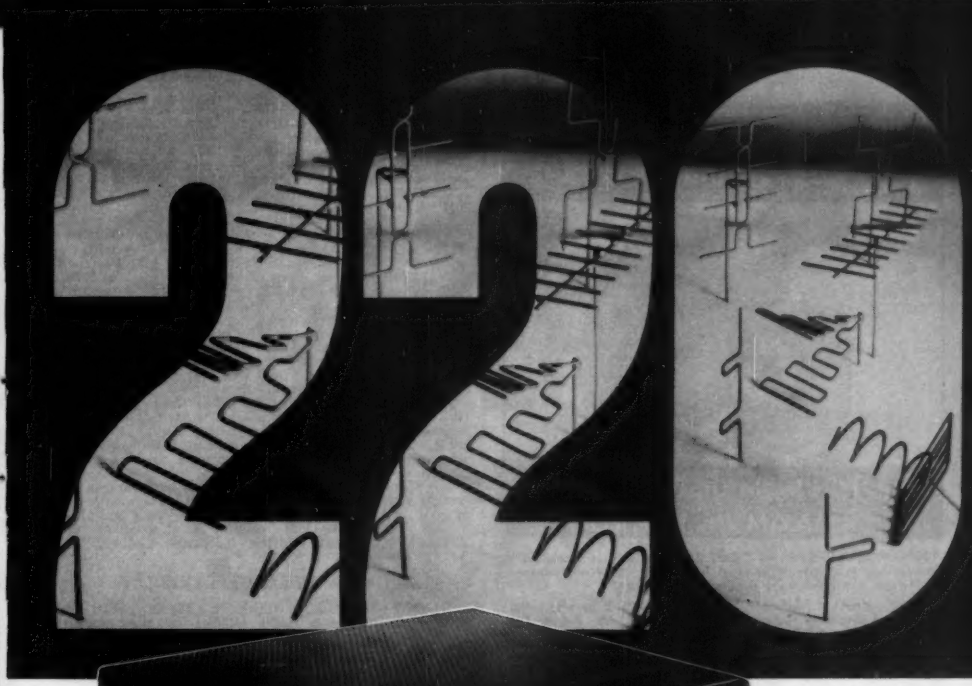
its 40th anniversary by dining at the Red Fox Steak House, Foxboro, Mass. Among those attending was AGR, one of the charter members of the Norwood Radio Club which developed subsequently into the Norfolk County Radio Assn. AGR still is very active on the air and in the club. After dinner some of the entries in the original journal of the club were read—*the first one dated Dec. 28, 1920.* Traffic: (Dec.) K1GNR 840, LLX 639, W1EMG 586, PEX 477, ZSS 417, EAE 293, K1MEM 234, W1DOM 197, K1MHM 178, W1HGN 165, TWG 155, K1PFS 150, DIO 140, W1OFK 122, FJJ 110, K1BUF 90, W1DFS 85, K1BGK 70, W1AUQ 67, VYS 60, K1NPL 52, W1SIV 49, K1GVR 46, LCQ 46, DTJ 36, KTK 32, GKA 30, GTX 30, W1RQL 29, HIX 20, K1GYM 13, CMS 12, HBM 8, MVN 8, W1RCQ 5, K1MHC 4, OPQ 2, IWP 1. (Nov.) K1MHC 131, BUF 53, JAW 53, GYM 7, IWP 1.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: BYH/K1APR. RM: K1IJV. PAM: DXS. All West. Mass. net schedules are the same as in previous West. Mass. section news. We regret to report the death in Florida of K4QLG, ex-W1ALR, one of the founders of the Montachusett Amateur Radio Club. K1IJV wonders if she has established a record by burning out both receiver and transmitter in a two-week period! It may not be a record but it sure is a good try at it. The Mount Hermon Radio Club has an SX-101 receiver (paid for by money earned by the students plus a matching sum by the school). K1LRB received an LA-400-C linear for Christmas. The Hampden County Radio Association is starting the awarding of club achievement certificates to members for their work in League-sponsored contests (former winners excluded). Over 80 members and guests were present at its December meeting. Present officers of the HCRA are RRX, pres.; STR, vice-pres.; HYO, secy.; and LRE, treas. The West. Mass. C.W. Net (WMN) handled 195 messages during December. The following were active on the West. Mass. Novice Net (WNNN): K1IJV, K1LBB, K1GCV, KN1PZR, KN1NWA, KN1OYJ, K1IQZ, KN1NMB and KN1NWF. MPN reports traffic of 317 in 27 sessions; needs representation from all areas. UDT has a 6-meter Communicator. AZW is the president of the newly-formed Dalton Lions Club. JDB and K1NSU are new members of the BCARA. BKG is on s.s.b., a.m. and c.w. with a new HX-500. New members of the c.d. program in Pittsfield are K1GFT, K1CTL and K1DAB. DPY showed slides of his trip around the U.S. at the December meeting of the Pittsfield Radio Club. From the BCARA bulletin: "If at first you don't succeed, you're running about average!" Traffic: W1LDE 277, K1LRB 258, W1BVR 238, K1IJV 165, LBB 164, DXS 143, W1ZPB 127, K1GXZ 83, W1IQZ 45, DVW 25, K1GCV 20, W1FAB 14.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1IIQ—SEC: K1IQK. RM: K1CIF. PAM: KVG. GSPN meets Mon. through Fri. at 2400 and Sun. at 1430 on 3842 kc. NHN meets Mon. through Sat. at 2330 on 3685 kc. CNEN meets Mon. through Sat. at 1145 on 3842 kc. Note the GMT schedule. New appointments: K1BGI and K1MOZ as OBSs. A fine time was had by all at the inauguration of the Contoocook Valley RC. The ARRL charter was presented by our Division Director, EFW, who gave an FB address on "The Balanced Amateur." Following short talks by the SCM and PAM, refreshments were served and a visit to the club house completed the evening. The GSPN was visited by "Santa," ONT, at a regular session. The jr. operators were thrilled. Achievement award certificates for 16 check-ins and 5 pieces of traffic handled per month have been presented by the GSPN to the following: K1GQH, YMJ, TA, FAB, CUE, JSH/2, and K1CFX. Any amateur in or out of New Hampshire is eligible. Traffic: K1CIF 1110, ITS 1043, MOZ 201, W1CUE 158, K1BCS 126, W1TA 76, ZUR 60, EVN 39, K1IIK 37, JDN 28, GQH 25, W1YMJ 19, IIQ 15, K1MNT 15, W1-KVG 14, YHI 11, ZUS 11, AIJ 9, K1CFX 7.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. Endorsement: GZA as EC of Warwick. Section Net certificates were issued to K1GRC, PNI, LCX, CPL, EBX, DZX, GRA, W1QR, TXL, BQH, JFF and HGN. Report of the RISPN: 31 sessions 308 QNI, 163 traffic. The LARA will hold a supper on Apr. 8. Tickets may be obtained from the chairman, K1DPR. K1HJS is president of the new Mt. St. Charles Academy, Woonsocket Radio Club. The club is presently teaching code and theory to its new members. KN1QGA and KN4CXE have just received their licenses. KN1QIT is advisor. Stations taking part in the National Civil Defense Day from the Newport Area were JFF, MMX, TXL, ETM, JHF and K1MCT. They contacted PAZ/1 at State Headquarters and received a message from the State C.D. Dir. K1CRN is now active on 220 Mc. and hopes to go s.s.b.

(*Continued on page 110*)





"220"... band for big gain...

GONSET COMMUNICATOR IV-220

220 megacycles... long regarded as a band of promise ... where big antenna gain comes easy. A quarter-wave antenna is only a foot long and good ground planes—including the top of a car—are easy to come by. Simple beams and even complex arrays of high gain are conveniently small in size—easy to put together and get up into the air. Here's a band where antenna experimentation can run rampant. Multi-element yagi's... stacked colinears... sleeve types... bedsprings... log-periodic types.. helicals. The band has DX possibilities too. Remember KH6UK to W6NLZ?

In Gonset Communicator IV-220 you have ready-to-operate "packaged" equipment that offers power to really go places on this fine band. On the intake side—an excellent triple conversion receiver having sensitivity of 1 microvolt for 10 db S+N/N ratio. And a noise figure of 3 to 5—exceptional for equipment of this general type. Receiver is continuously tunable but also includes provisions for spot frequency reception on one crystal controlled frequency. (A C-D requirement.)

Power input to 6360 final amplifier is 20 watts, amplitude modulated by P-P 6BQ5's. Transmitter is crystal controlled, has 6 crystal positions. Dual power supply is built-in, operated from 12V DC/117V AC, is equally well suited to fixed station or mobile operation.

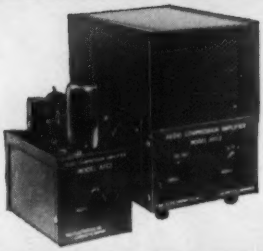
C-D Models: Model 3351 is certified to OCDM as meeting applicable specifications, qualifies for matching funds when furnished with Model 3361 C-D Kit.

Communicator IV-220.... #3351 ..... $394.50
(Less microphone, crystals.)

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USE A
P&H AUDIO COMPRESSOR



FOR MINIMUM DISTORTION
MAXIMUM TALK POWER

100% MODULATION—WITHOUT DISTORTION is practically impossible to attain with most ham rigs. NOW—Thanks to P&H—you can have your cake and eat it too!

Simply connect a P&H MODEL AFC-1 or AFC-2 between the mike and the mike input of any SSB, DSB, AM, PM or FM transmitter—Set the transmitter audio gain control for 100% modulation and FORGET IT! From a WHISPER to a SHOUT—the compressor output level NEVER VARIES MORE THAN 6DB. May also be used on PA systems to maintain high audio output without blasting.

NOT A CLIPPING DEVICE! This is an AVC type compressor, like broadcast stations use. Operation is instantaneous, with no pumping effect. Built-in audio filters and SEPARATE HIGH and LOW IMPEDANCE CIRCUITS.

HIGH IMPEDANCE threshold is set at −52 DB and will provide up to 50 DB of compression with negligable distortion. LOW IMPEDANCE threshold is set at −25 DB, and will provide up to 40 DB of compression when used between the speaker and the audio output of a receiver; resulting in excellent AVC action from receivers with poor RF AVC characteristics.

MODEL AFC-1 (3" x 3" x 5") requires an external power source (often available from transmitter or receiver) and contains a 90-3500 cycle bandpass audio filter.

MODEL AFC-2 (5" x 5" x 7") has a built-in power supply and a switch controlled BROAD-MEDIUM-SHARP audio filter.

MODEL AFC-2CW is identical to the AFC-2 except for much sharper audio filters. It is intended for use with filter type exciters and for CW reception when used in the speaker line of receivers.

MODEL AFC-1 With tubes (less power supply).....$32.95
MODEL AFC-2 or AFC-2CW Complete $54.95

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on 6 and 2 meters soon. GRC worked K6SIY/9, WA6-LKX/4 and DHB recently on 6 meters. K1PNI is building a new shack for all his new equipment. LPL is building a new 200-watt trans. FEO now is operating on 2 meters with a 242 Lettine transmitter and a five-element Telerex beam. Traffic: W1SMU 1007, TXL 500, K1GRC 152, BBK 57, DZX 39, GOX 37, W1WFZ/1 36, K1PNI 19, AAV 15.

VERMONT—SCM, Miss Harriet Proctor, W1EIB—SEC: K1DQB. PAM: HRG. RM: KRV. Vermont frequencies: C.w. 3520, phone 3855, RTTY 3620 kc. Nets: C.W., Mon.-Sun. at 1830; GMN, Mon.-Sat. at 1730; VPN, Sun. at 0900; VEPN, Sun. at 1730. Congratulations to KRV and the VTN for a great start in December. Fifteen different stations checked in and cleared 57 pieces of traffic. A net bulletin is being issued to net members. Joe would like to have other stations join the VTN. Our section has about 15 members who are active in the Satellite Data Link work. K1BQB is one of the leaders. Our best wishes to KN1QLO and KN1-PUP on getting their Novice Class tickets. K1IRH is the new manager of the GMN and K1OAJ is his assistant. K1DKN is liaison between the GMN and VTN. The Burlington Amateur Radio Club has now equipped its trailer with heat, so cold weather will be no hindrance to effective emergency use of the trailer. Your SCM would like to hear from amateurs in the section who do not participate in nets. There are a lot of you and we'd like to hear about your activities. Traffic: VE2AZI/W1 1599, W1KRV 86, K1BQB 46, W1-KJG 23, K1OAJ 22, W1EIB 16, HRG 6, K1OXD 6.

NORTHWESTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Calling all ECs and Radio Officers to plan *now* for every county to be active in the spring C.D. Alert. Arrange for a monitor station to accept and deliver traffic in *your* county. The Lewiston-Clarkston Club is sending lots of QSLs but no Centennial Certificates have been issued as yet. K7BWV had to drop NSN net control because of the pressure of work. FARM Net roster and traffic are increasing each month. LQU needs 4 states for WAS on 20 meters. EMT fired his own ceramic spacer insulators for feed line. GMC rebuilt the TV amplifier to a 6-meter converter. K7ENE has a new son. HAU and family spent the holidays in California. K7CXP joined the 2-meter boys with an HW-30. K7GHX is planning to move out of the State and is selling his accumulation of ratio gear. GGV has been appointed chairman of the nominating committee for the YLRL. Traffic: (Dec.) W7GMC 52, YQC 50, EEQ 35, GGV 15, DWE 12, K7BWV 10, W7EMT 5. (Nov.) W7GMC 87.

MONTANA—SCM, Ray Woods, W7SFK—SEC: BOZ. PAM: YHS. RM: K7AEZ. The MPN meets M-W-F at 1800 on 3910. TSN meets M through F at 1200 on 7230. MSN meets TTS at 1830 on 3530. The Missoula gang went all out to replenish the supplies for Christmas that the Salvation Army lost in a fire. We hear that UKT is leaving for Kansas. Sorry to lose you, Leo. EKB is back from the Army and active on the bands. The Montana QSO Party seemed to have a few working. YPN is working on a new final. ZOH had wind trouble with his antennas. RZY worked his shack over to accommodate RTTY. BPF is a new trailer house. LPL is moving to a place where antennas will grow. 3980 kc. is a good place to find the Havre gang for a ragchew. 91KY/7 has a new HQ-180. NPV is real busy in his radio shop. A radio class for amateurs is going on in Harlowton this winter. K7BKH still is at her BPLs. BIS moved higher up on the hill at Helena. Appointments: K7CTI and COH as ORSs. AZY reports that the Old Faithful and Harlo Radio Clubs had Christmas parties in December. Traffic: K7BKH 475, DCI 270, W7EKB 138, K7EWZ 79, DCH 78, IOA 23, W9IKY/7 12, K7MUL 10, W7OIO 9, BUT 8, YQZ 4, K7GHC 3, W7ZCG 2, EWR 1.

OREGON—SCM, Hubert R. McNally, W7JDX—LT had eye surgery and is OK now. K7CNZ was working with K7JJJ on 5800-Mc. rigs but developed receiver trouble. GUH received a new Valiant for Christmas. MTW is the new mgr. of OSN. DEM is making the SCM very unhappy with fish pictures, but we will show him up next summer! K7KBK is a new OPS and is really handling the traffic these days. K7BDU is building a new 800-watt n.f.m. for 6 meters. Watch out for ZB soon on 6 meters; we understand he has a Heath Sixer. WKP, our new SEC, is stirring the gang up and has some new blood in sight. A nice holiday card was received from Don Harbour and wife, ex-TLC, now at Box 927, Colorado Springs. A nice report was received from K7WFP on group activity at Portland during the search for a missing girl; also a fine report from K7JQS, Jackson County EC, on the activity of that group dur-

(*Continued on page 118*)

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ing the lack of telephones in that area during the big storm. K7CNZ wants to be an OPS. K5GOJ, of Albuquerque, N.M., says he expects to be in Portland soon. K7JSJ and VCM also are working on 5700-Mc. gear but believe we are losing K7JSJ, who says he is moving to California. K7CLL sends in some fine dope on a charitable affair he has been in on with others. Guess there will be an election soon but yours truly is still hanging on. Hi. Traffic: (Dec.) W7ZB 780, K7KBK 517, W7BDU 372, K7AXF 298, W7DEM 63, ZFH 59, DTT 56, MTW 45, GUH 25, AJN 16, K7CNZ 14, JWY 7, W7LT 6. (Nov.) W7ZB 270, ZFH 49, K7JQS 27, CBA 13, BDU 8.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—SEC: HMQ. RM: AIB. PAMs: LFA and PGY. The SCM will welcome reports from the many clubs throughout the State with reference to their elections and meeting dates. All AREC members are reminded and are invited to check in on the AREC Forum held the last Sun. in the month at 2000 PST on 3970 kc. K7JAL has moved to W6-Land. YBI holds daily skeds with 6IAB for Northwest traffic. New officers of the North Seattle Amateur Radio Club are K7CFC, pres.; AYD, vice-pres.; K7JRF, secy.; K7DPO, treas.; K7-EHY, sgt. at arms. The trustees are W7s CO, VX, IMV, OEX, LWB and ZXM. The WARTS Net had 27 sessions for 1749 check-ins and 323 pieces of traffic for December. The Valley Radio Club monitors 29,510 kc. and the Tacoma gang monitors 29,600 kc. Seattle soon will have a monitor of 29,000 kc. AIB renewed his RM appointment and HMQ his SEC appointment. Other renewals were AMC as OPS, K7EHP as EC, JEY as ORS. K7JEM is on the air from a new QTH near Edmonds. K7KRZ and K7LYT worked Indianapolis on 10 meters using 5 watts. The North East Washington Sevens Amateur Radio Club of Colville has been granted affiliation with the ARRL and the officers are GZB, pres.; K7INV, secy.; JTR, treas.; BUP, act. chmn. PVF has Amateur Extra Class No. 69 out of the Seattle office. New officers of the Richland Amateur Radio Club are NNF, pres.; HPA, vice-pres.; VFR, secy.; OEB, treas. New amateurs active in the Spokane Area are K7NLD, K7MAS, KN7NOX and KN7MQE. The Spokane Radio Club had its annual Christmas auction for charity and raised nearly one hundred dollars, which is usually given to a needy family. AXT has a new Corvair and wonders where he can put his AF-67 and Gonset converter. K7CWO/7 is working at Boeings. ACA will assist YFO in the Benton Co. AREC. QLH is the new manager of the WSN Net. AMC says the 80-meter band thinks it is 10 meters. He can hear ZLs but cannot work a fellow 30 miles away running a kw. KN7LQA is moving to a new QTH. The Skagit Amateur Radio Club is QRL planning its annual hamfest dinner for April. Are you an AREC member? If not, contact your EC, SEC or SCM for the necessary forms. Also urge your fellow amateurs to join the League. HNT sends very interesting news from Spain. USO renewed his ORS appointment and K7ASY his EC appointment. Traffic: (Dec.) W7BA 2928, DZX 1479, PGY 1229, HUT 768, K7HIL 589, W7GYF 213, KZ 200, AMC 160, APS 132, QLH 125, GIP 107, JEY 86, K7MFF 82, W7ACA 80, EHH 46, IST 44, BTB 35, VPW 35, OEB 33, AIB 23, YFO 14, K7BBO 12, DDQ 12, CWO/7 8, W7OMO 7, AXT 2. (Nov.) W7QLH 220, YBI 51.

PACIFIC DIVISION

NEVADA—SCM, Charles A. Rhines, W7VIU—New appointments: IWT, JKV and K7CJZ as ORSs; K7-ETN as ORS/OO. K7BJB got a new beam up only to find the traps reversed. JDI is back on Okinawa. DEF has been appointed by the American Legion to the Amateur Radio Network Committee. ANK has his Apache and SB-10 going. JUV has his Heath 6-meter rig on. BJB is building a new operating console. NRU is using the 2-meter repeater which is going strong. ZT has gone RTTY. PC has secured two 5-kw. emergency power units. K7ILB, HRW and W7MAH are on 6 meters daily looking for openings. HJ, JU, BVZ, PWE, TKV, K7BVX and ICW are all active on 2 meters in the Las Vegas/Boulder City Area. K7HDY, LPF and W7WLV are active in Empire with two more working for their tickets. The NARA rated 20th in its class on Field Day. VIU is off the air with rig trouble but had a nice Christmas Day contact with sou YNO over KOI's rig via K3NSS and W3HQE. Traffic: K7CJZ 48, ETN 27.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—New officers of the Santa Cruz RC are W6-LZK, pres.; W6MUU, vice-pres.; WA6GWM, secy.-treas. K6BJ gave a talk and was honored with a life membership in the club. W6HC, representing the CCRC, also presented John with a plaque in recognition of his con-

(Continued on page 114)



Army Signal Corps Photo

NED RAUB (standing), W1RAN, Raytheon field engineer, and Anthony Colaguori, W2GUM, of the Signal Corps R&D Lab, work together on data transmission problems.

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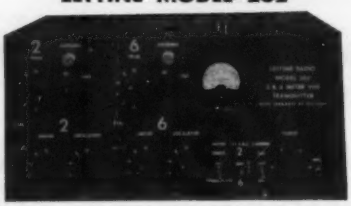
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tributions to amateur radio. The SCARS Annual Christmas Party held in San Carlos Dec. 10 was enjoyed by the members and their YFs. New officers of the San Mateo RC are K6HWV, pres.; K6PJW, vice-pres.; W6IPO, secy-treas. Project OSCAR, "Orbiting Satellite Containing Amateur Radio," is pushing ahead. The boys at Lockheed report much of the gear is designed, built and tested. The San Jose 2-Meter Net is very active and growing under the able leadership of chief op. W6OOY. Santa brought K6FL a new 100V. K6ZCR has a new Hy-Gain antenna. W6YBV has a new power supply for QRO. New QTH and antennas are working out FB for WA6HRS. W6FON reports that of 30 messages delivered none were incorrectly addressed. W6OII had a bad fall from a stepladder at work. He injured his face but after hospitalization for a few days was back in business with two beautiful black eyes. Best wishes to Lewis Howell, W9YEA/6, as EC for Santa Cruz County. W6OKK, former OO, has moved to Atherton and out of the section. Traffic: (Dec.) WA6OAQ 851, K6ZCR 581, K6DYX 521, W6DEF 173, W6YBV 170, W6AIT 148, W6FON 148, W6HC 113, W6OII 61, W6YHM 44, K6VQK 37, WA6OLQ 33, W6RFF 24, W6RSY 24, K6EQE 9, K6GZ 8, K6SMH 2. (Nov.) WA6OLQ 13, K6YKG 12.

EAST BAY—SCM, B. W. Southwell, W6OJW—K6GK is fighting QRN and QRM on the traffic nets. WV6MAV, in Fairfield, is using a BC-459 and an SX-110 on 7-Mc. Novice frequencies. W6NBX, RM for NCN, is looking for traffic stations in Lake, Napa and Solano Counties. K6DQM is net check-in on NCN. WA6LVX and WA6ECF are new NCN check-ins. W6HBF disbanded the home rig and has gone mobile with 400 watts. W6HBF/M, K6JHV, K6DMI/M, K6ESZ/M and W6OPL/M participated in the search for a lost plane near Petaluma. The CCRC held its December meeting in San Rafael. K6ZBG demonstrated mobile DF gear to the EBRC at its December meeting, and the club elected officers for 1961. The Oakland Radio Club's new officers are K6KQD, pres.; K6DOQ, vice-pres.; K6LWA, secy.; WA6CVI, treas.; K6OXK, sgt. at arms; W6JUB, EC; W6JOH, chief op.; WA6EWI, public relations officer; W6FDJ and W6ELW, directors at large. WA6HYU, the XYL of your SEC, got a new Hammarlund 180 from Santa. K6DQM got a new S/Line and Thunderbird TH-4 beam for Christmas. W6LGW is the new MDARC president. K6DQM is vice-president of the CCRC. The MDARC held its Annual Christmas Party Dec. 15 in Walnut Creek. W6FAR is the new EC for Eastern Contra Costa County and W6WAH is the new EC for Vallejo and Western Solano County. K6KWX is moving to Idaho Falls. W1HWK was a Christmas visitor at WA6CNW's. Other 1961 MDARC officers are K6MFA, vice-pres.; WA6HYV, secy.; WA6CNV, treas.; WA6DKG, board member. The RARC held an election of officers at its December meeting. WA6KUF has a ham family—WV6LUU is his XYL. WV6BNC his mother and WV6NBD his dad. K2PTW/6 is waiting for his W6/K6/WA6 call. K6JHV has a new HQ-180. BCNU next month. Traffic: (Dec.) W6NBX 529, K6ZYZ 232, K6GK 180. (Nov.) W6NBX 276, W6HBF 2.

SACRAMENTO VALLEY—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William van de Kamp, W6CKV—K6EIL reports that he is waiting for two SS QSL returns to cinch WAS. W6WLI has his modulator working and gets on 40-meter phone once in a while, but still does lots of listening and reporting as an OO. W6AF says that the cold weather froze his beam bearings and he had to wait for the sun to thaw it out. Bill visited in Sacramento over the New Year week end babysitting with the grandchildren. This is the extent of the reports received. Where was *your* report? Good luck to the new SCM, George Hudson, W6BTY, of Sacramento. Traffic: K6EIL 7.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—W6OUX won the Fresno Amateur Radio Club "Boner Trophy." It seems as though he forgot to plug in his modulator tubes in his mobile rig and called CQ for 90 miles with no luck. W6TKF has a new Drake 2A receiver. K6BGO has a 100-V exciter. W6QON is the general chairman of the Fresno Hamfest which probably will be held May 6, 1961. W6JLF is heard on 75-meter s.s.b. with an HT-37. K6GOX worked XE1GE on 6 meters. W6MJS is on s.s.b. with a 20A. W6NYV is active on both 144 Mc. and 420 Mc. and working into the Los Angeles Area down south and working W6AJF on 420 Mc. to the north. W6NTV is active on 40-meter c.w. and s.s.b. with an S/Line. The NCN (1900 PST, 3535 kc.) could use help from Kern, Fresno, Madera, Merced and Stanislaus Counties. W6EFB is working on 2-meter equipment. The SJVN for December had 27 sessions, 449 check-ins, 54 contacts, 1 traffic, 10 phone calls, 3 QST. W6CUA is the net manager of SJVN. W6JXY has a new Jones micro-match. W6QFR is think-

(*Continued on page 116*)

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ing of doing some trading for s.s.b. equipment. W6NKZ had his converter stolen out of his car. K6BKZ passed the commercial 2nd-class exam. W6QON is active from his new QTH on 80-meter a.m. K6HTM has a new Drake 2A receiver. W6EJD spent a couple of weeks in St. Agnes Hospital with a bad back and is now on the mend. W6JPS is working on a v.f.o. for 2 and 6 meters. W6FXV has his 813 g.g. amplifier working. K6KQM silver-plated the 2-meter cavity for the repeater station. Traffic: (Dec.) K6ROU 181, W6EFB 32. (Nov.) W6EFB 18.

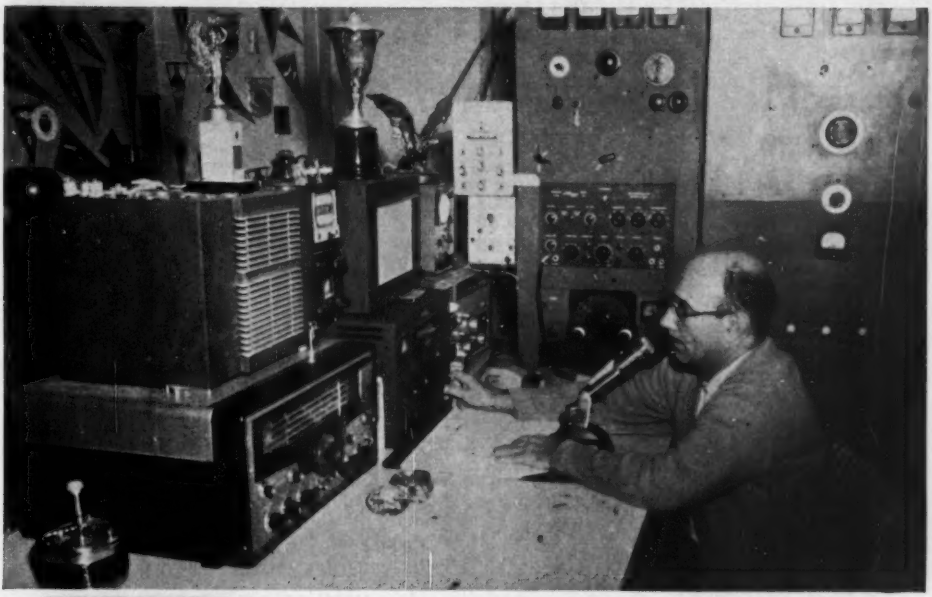
ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH —PAM: DRC. V.H.F. PAM: ACY. RM: PNM. Except for the few reports that have come to me we have had a very good year. PNM and company have made a success in a big way with the c.w. net. QC and company have continued to improve the State Phone Net and have an excellent traffic system between the c.w. and phone nets. A number of counties and/or districts have worked out a good local net on v.h.f. Notable of these are Winston-Salem, Catawba County, Lincoln County, Gaston County and Jackson County. At least two RACES groups have completed a mobile unit—Forsythe and Cleveland Counties. (Cleveland County also has a good v.h.f. net). I am not sure, but I believe that Nash and Edgecombe Counties have a v.h.f. net in operation. The Burke/Caldwell/Avery/Madison and Mitchell County Area has both a 2-meter system and a 6-meter system. RXG has been named 2-meter Alternate NCS for the period just ending. CPI, Forsyth County EC, sends a good report of activity. The group sent the SCM eight messages during the S.E.T. These boys have a ham on 2 meters, KN4-CPH in Fancy Gap, Va., who has a good signal and can act as relay into Raleigh, N.C. It is planning such as has been shown in certain areas that really pays off when we need coverage in a hurry. Congratulations, fellows.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—K4UOH is a new addition on the c.w. net. CPX is Radio Officer for RACES, Greenville Area. CXO still handles much overseas traffic, particularly into South America for some of the Winthrop students. ØYFT/4 will be stationed at Shaw AFB for the next two years. He will be a nice addition as a c.w. net member and OO. K4AYJ will be operating portable from March '61 to Jan. '62 and will be affiliated with ARC KA2MA as OES. K4BRP made the BPL in November. We hope that others will work for the medallion this year. All new club secretaries are urged to send activity reports each month to your SCM. GQV meets with the Palmetto RC in January to start off the activities of the year. New officers of the club are K4MVO, pres.; YQD, vice-pres.; JBS, secy.-treas.; and K4AVU, custodian. Twenty-four RACES plans have been approved in the State. Traffic: (Dec.) W4-KNI 214, K4AVU 154, GAT 151, ZHV 113, W4FFH 73, AKC 59, K4BRP 49, W4PED 48, K4HJK 33, W4VIW 29, W9QNI/4 22, W4ANK 20, K4HDX 17, W4CHD 16, K4UOH 11, KIT 10, W4SEF 6. (Nov.): K4BRP 323, W4PED 13.

VIRGINIA—SCM, Robert L. Follmar, W4QDY PAM: BGP. RMs: K4QER, K4MXF, K4KNP and QDY. Club news: PVA says the boys in Prince Wm. Co. are trying to form a club of their own. The Lynchburg gang puts out a very nice paper with lots of activity indicated (72 members). The Roanoke paper is also hard to beat. Our former VN Mgr., K4JKK, is getting married in May. The Alexandria outfit puts out a very snappy one-page *Bully-tin*. JXD deserves much credit for this. A real fine paper is *Auto-Call*, published by the Foundation for Amateur Radio, Inc., Washington, D.C. Kudos to Ralph, 3NL, and Ethel, K4LMB, for an excellent bulletin. We need more interest as well as ECs for some of our larger cities and areas. Richmond and Roanoke, please note. K9CVJ/4, MYA, K4DOR, J8J/4 and K4F8S made BPL in December! J8J/4, the VN Recorder, is trying to convince the XYL he needs a new transmitter. K4FMJ and OOL are experimenting with new sky wires. K4AL made BERTA and WBE (on c.w.); he also reports 100 per cent attendance on VFN during December. K4LTK's XYL (K4FWX) had a new harmonic, the kids got a puppy and the relay in the rig blew up. Never a dull moment. JUJ is sporting the Va. Cradle of Democracy and WAWC awards. We hear that K4KNP will be active again in the near future. Norfolk news: K4KSG and 8THF/4 have joined the s.s.b. ranks; K4SSK is back following school with the Navy; K4HUW, K4TLD and K4YKX are building W2ELW exciters; BGP will remain in this area and continue as PAM; the TMRC, Inc., is publishing a

(*Continued on page 118*)



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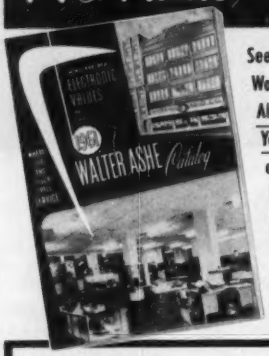
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monthly *News*. K4LPR is the very capable editor, with QDY doing the printing and mailing. ZM travelled some 12,000 miles during December and visited many amateurs. Traffic: (Dec.) K9CVJ/4 532, K4QIX 497, W4MYA 455, K4LRL 371, W4PFC 365, K4DOR/VDU 360, W4JSJ/4 337, QDY 317, K4PQV 274, MXF 267, W4IA 256, LK 153, K4FS8 132, W4BGP 88, K4FMJ 78, W4OOL 78, K4ASU 76, JQO 75, AL 49, W4CXQ 48, BZE 46, RHA 42, KX 33, K4PQL 32, LTK 21, W4OWV 18, K4TUE 16, BUI 13, W4JUJ 12, AAD 9, ATQ 6, K4LPR 6, LHB 5, W4ZM 5, K4CHA 4, IIP/4 4. (Nov.) K4MXF 276. (Oct.) W4HFH 52.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—The Blennerhassett Radio Club, sponsored "Toys for Tots." The toys were picked up by GRW, IBF, OFB, MIT, WEJ, K8HYE. K8PCT is operating mobile on 6 meters. WUB and FNI attended the Blennerhassett radio meeting. New club officers of the Kanawha Radio Club are K8CNB, pres.; VMP, vice-pres.; K8QMB, secy.; K8MNF, treas.; K8PAE, act. mgr. K8CSG, State RACES officer, K8CNB, pres. of KRC, and K8BIT, editor of *Splatter*, visited the East River Radio Club at Bluefield. KN8SPX is looking for W. Va. from Texas on the 15-meter band. HNK is back on the air. The s.s.b. net is going great on 3905 kc. six days a week at 2000. DYA, S8A and K8CYK are active on s.s.b. from Bluefield. GIU, editor of the Elkins Club bulletin, *Short Skip*, is quite active in club and EC work. UHK has moved to Weston. AXU's move to Parkersburg is a loss to the v.h.f. gang. Al very seldom missed a v.h.f. opening or party when he was in Elkins. FNI is a new OO and K8RPB a new OES. K8BLR reports 6-meter contacts are on the decline. Holiday traffic helped the c.w. and phone nets. Traffic: W8PBO 386, FNI 352, WUB 160, K8JLF 140, W8NYH 134, K8QXS 114, LOU 66, W8GAD 64, K8CSG 13, W8DFC 10, K8QYG 9, W8OIV 4, UYR 4.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Carl L. Smith, WØBWJ—Asst. SCM; Howard Eldridge, KØDCW. SEC: NIT. RMs: WME and MYB. PAMs: CXW and IJR. OBSs: DCC and EPD. New appointees are EKQ as ORS and NVX as OPS. Colorado traffic activity continued to increase during 1960 with CWXN leading in most consistent QNI, HNN in total QTC and CCW with the highest average QNI per QTC. IUF is the most active OES in Colorado, reporting three new states on 144 Mc. for a total of ten, plus equipment under construction for 1215 Mc. *Splatter Chatter* reports increased v.h.f. activity in Ft. Collins with ZFM and FRQ as new operators on 2 meters. The Mile Hi Hi-Banders report eight new calls to the 6-meter group: HWA, WFT, ZQR, SJM, DNW, ZGR 7BEX/Ø, and 8BEX/Ø. As Division Director, BWJ desires to receive comments and suggestions from all amateurs relative to League activities, particularly for increased v.h.f. activity, participation in and knowledge of traffic-handling procedures by all AREC members, increased ARRL membership and activity by newly-licensed amateurs, etc. Congratulations to the following on making BPL in December: FEO, WME, DCW, EDH, EDK and WWD. Traffic: KØWWD 794, EDH 665, EDK 646, WØWME 572, FEO 506, KQD 352, EKQ 270, KØDCW 260, WØMYB 102, KØEVG 73, WØCBI 70, KØQAN 61, WØENA 31, ACD 20, IA 20, BES 10, KØVDM 10.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, 7OCX. SEC: K7BLR. RM: OCX. V.H.F. PAM: SP. 1960 was the best year for the Beehive Utah Net. This was possible only through the coordinated efforts of the NCSs, net members and others who assisted with relays when conditions were rough. K6MPJ now resided in Layton and is heard regularly on s.s.b. with his S/Line. K7IMB, in Pocatello, Idaho, has received the net certificate on BUN, OCX, QWH and K7BDX again received BRAT awards for work on BUN. OCX also made it on TWN. CYG and ex-KN7EHH became OM and XYL, respectively, on Dec. 23. OCX and K7NWP made the BPL. These are the first to make the BPL from Utah for quite some time. Congratulations. DQW and K7BLR helped QWH take down the 40-meter beam. It should soon appear at the new QTH. Traffic: K7NWP 523, W7OCX 369, QWH 70.

NEW MEXICO—SCM, Newell F. Greene, K5IQL—Asst. SCM: Carl W. Franz, 5ZHN. PAM: ZU. 10-meter PAM: LQM. V.H.F. PAM: FPB. RM: ZHN. The New Mexico Brass Pounders meets Mon., Wed. and Fri. at 1900 MST on 3570 kc. TWN meets daily at 2000 on 3570 kc. The Breakfast Club meets at 0700 Mon. through Sat. on 3838 kc. NMEPN meets Sun. at 0730 and Tue. and Thurs. at 1800 on the same frequency. UAR is convalescing after a heart attack. Clubs desiring League

(*Continued on page 120*)

A 30-SECOND QSO

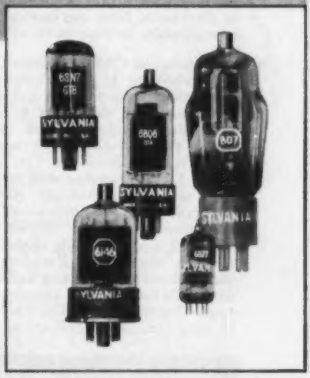
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representation should contact our new Director, ØBWJ. Old 3838 proved itself as the "Main Street of New Mexico" during the December ice storm when virtually every community in the southern half of the State was isolated. Those 96-ft. masts from MARS should be sprouting skyward at New Mexico v.h.f. stations. Traffic W5ZHN 551, K5IPK 393, W5UBW 94, ZU 4.

WYOMING—SCM, Lial D. Branson, W7AMU—SEC: IAY. GZG has been appointed net manager for the YO Net. The Pony Express Net meets Sun. at 0830 MST on 3920 kc. The Wyoming Jackalope Net meets Mon. through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc. The Wyoming Hamfest will be held about the middle of July in the Big Horn Mountains. BHH is holding RACES drills on Wed. evenings with 11 or 12 check-ins. YWW is cleaning up his ham shack. A Brass Pounders League certificate has been awarded to HH with a traffic count of 612 for December. AEC is on crutches because of a sprained knee. PVN is going sideband. HFP is being transferred to Sheridan. K7KLE visited with Casper hams for a couple of days. Traffic: W7DXV 90, AXG 52, K7HBB 44, W7LKQ 34, YWW 31, K7IAY 19, W7BHH 15, AMU 12, KLE 9, AEC 2, BXS 2, CQX 2, BKI 1, GBX 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—SEC: JDA. RM: RLG. PAMs: PHH, BTO and JJX. New appointment: K4RJM as ORS. Congrats to SEZ, EAW and K4GRA on receiving AENB Net certificates. High QNI on AENB in December was K4YUD, 28 times. Congrats to K4ZXX on making BPL in December. K4AWN reports three Novices in the Valley Area, KN4NPB, KN4NPJ and KN4NPK, and reports 50 hams in Chambers County. K4PHH has a new Viking 500. K4HJM, KGH, PVG, K4MEP, DSO, SDG and UEC are working on RTTY. K4ZXX has a new SX-101 and reports AENT broke all previous records of the net for traffic handled and participation for December. PKA reports new officers of the Decatur ARC are HVK, pres.; FQQ, vice-pres.; KN4WHV, secy.; BFM, treas. PKA has moved to a new home in Decatur. K4BFF is serving with the Navy and attending Air Force radio school in Texas. Congrats to K5BQU on making DXCC. Congrats to RK8 and his XYL on a new baby daughter. K4RSB reports that the following members of the Huntsville ARC participated in a drive to collect items for the Christmas Charity Services: YFN, AWV, NIQ, MAM, K4DQJ, FPV, GTQ, LFN, IQU, RSB, YKQ, YUD, BFT, ARQ, VJL and K1GEU/4. New officers of the Birmingham ARC are K4DSO, pres.; K4AAU, sr. vice-pres.; K4TJG, jr. vice-pres.; K4DJQ, secy.; K4HAG, treas.; DFE and A8W; DEC. K4AAU, 1961 Birmingham Hamfest chairman, urges all to start making plans to attend Birmingham's Eighth Annual Hamfest to be held May 7. *Six Meters News*: Congrats to the following AENO members on receiving AENO Net certificates: K4WHZ, FHG, KAM, UPA, VIZ, RAG, OXS, OVE, HNO, W4HSU, LHG, MWF, LLN, DZZ, Z8Q, JJX, CEC and KWJ. K4TIY, AENX manager, reports 60 per cent of the members participated in December. K4BFT and K4AOZ are now mobile on 6 meters. K4JSP, Asst. EC Jefferson County, is busy with advance plans for 1961 Field Day. AUP kept in touch with the Montgomery gang on 6 meters from his hospital bedside. K4OIJ has an HW-29/M on 6 meters with a four-element Telrex beam. TOI and nephew in Chattanooga are working RTTY. Traffic: (Dec.) K4ZXX 640, SAV 220, W4RLG 184, K4AOZ 110, W4KIX 79, OKQ 66, PVG 65, K4PHH 43, W4YER 42, K4KDF 41, GXS 35, W4MI 33, K4BFT 26, ZNI 24, BTO 20, AAU 18, KN4WHV 14, K4HVN 13, TDJ 13, HFX 11, W4WHW 11, K4RSB 9, AWN 8, ODU 8, W4EJZ 6, K4RCA 6, UMD 6, W4GKO 5, AUP 4, K4HJM 4, OVE 4, W4RTQ 4, K4ZBX 4, W4CIN 2, FUT 2, K4RIX 2, W4TOI 2. (Nov.) W4KIX 45, K4KDF 14, OIJ 6.

EASTERN FLORIDA—SCM, John F. Porter, W4KGJ—SEC: IYT. RM: K4KDN. PAMs: SDR and K4LCF. V.H.F. PAM: RMU. Your new SCM for this section is K4SJH. Ham lives at 1300 N. E. 42 Street, Pompano Beach, Fla. His full name is Albert L. Hamel and all reports should now go directly to him. The Broward ARC is holding its Fifth Annual Auction and Hamfest Mar. 11 at Ft. Lauderdale. Doors open at 8 A.M., the auction will be held from 10 A.M. to 5 P.M. K4UUO has been nominated for the Edison Award for 1960. Frank did an outstanding job during and after Hurricane Donna. For the information of you old-time Morse guys, the FCC says you can use it on amateur bands provided you identify in International Morse. New officers of the Broward ARC are

(*Continued on page 122*)

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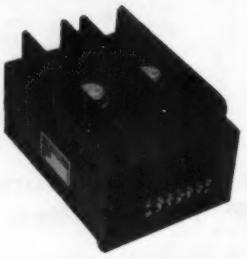
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K5SJH, pres.; W4YOX, vice-pres.; K4EHE, secy.; K4LJS, treas. Now is a good time for you to take a second look at your local AREC and RACES plans. Do they fit the bill? Did everything go as it should during and after the hurricane? If it didn't then it is up to you to help get matters straightened out. Contact your EC and RACES Radio Officer and see what you may be able to play in the future. If you don't know who your EC is, then contact the SEC for this section (IYT) or your SCM. I believe that everyone should be willing to do his or her share of public service work and keep amateur radio before the public as it should be. We now have 1108 AREC members in our section with 228 official mobile units and 128 emergency radio units. The number should be twice this. Can we count on you this coming year. Don't wait until the next hurricane hits. Traffic: (Dec.) K4SJH 2013, EHY 849, W4FPC 470, K4FMA 438, W4SDR 372, K4COO 354, LCF 305, KDN 302, BY 273, W4EAT 253, K4DBT 239, W4FE 172, K4BZ 152, LVE 147, W8LDU 147, W4TRS 136, K4AX 124, ILB 124, BLM 111, YOQ 109, W4GJI 108, K4AKQ 102, ENW 100, VSA 95, DAX 73, DZS 70, W4NGR 69, K4RNS 67, W4CNZ 64, K4MTP 51, W4IYT 47, SMK 47, K4EHW 41, W4SGY 40, LMT 36, K4ANR 33, TDT 29, W4BKC 26, LSA 23, DSH 22, K4BZS 21, MVS 16, ZIF 12, W4DQS 10, K4DAD 9, W4GOG 7, K4TDN 7. (Nov.) W4SDR 320, EHW 29, GOG 7, IWM 6, RUO 3.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: MLE. PAM: WEB. RM: K4UBR. A Section LO meeting has started every Sat. at 1500 CST on 3836 kc. for the SEC, SCM, all ECs, PAMs, RMs and Net Managers. Perry: KQP has a new AREC setup. YLP is back on the air from a new QTH. K4NJH has a new receiver. Madison: PBO is monitoring 52.9 Mc. and working on a 6-meter transmitter. Monticello: K4BDA is the new EC for Jefferson Co. Quincy: K4QDN got a v.o.m., an f/s meter and a bug for Christmas. Tallahassee: K4ARK is active with a new Cheyenne. GAA won the first of the monthly competitions to be held between local AREC teams, based on net participation. CMG is mobile on 40 meters. MLE and CMG made high scores in the SS Contest. A surprise AREC drill proved to be very successful. Port St. Joe: K4RZF has relieved K4RZM as EC. WEB is the new PAM. Ft. Walton: ROM is very active as an OO and has joined Army MARS. Gulf Breeze: AKJ is back on the air, joining K4EAP, K4RIV and K4ZMV. Pensacola: The V.H.F. Club held an FB Christmas Party; a visitor was your SCM. K4QOJ/K4BDF work lots of DX from their well-equipped shack when not mobiling on 6 meters. K4QAC continues to work 6 meters fixed, mobile and aero-mobile. AXP renewed RM and ORS appointments. Christmas brought K4CFS a bug; K4WVA a VTVM. WVA and YYE are new General Class licensees. K4RMO, K4SOI, K4HYL, K4SWQ, EWG and OOW took part in the search for a lost boy. Traffic: (Dec.) K4UBR 551, CNY 506, W4MLE 237, K4VND 128, W4BVE 126, WEB 13, K4ZMV 4, W4PBO 2. (Nov.) W4SRK 317, K4UBR 176.

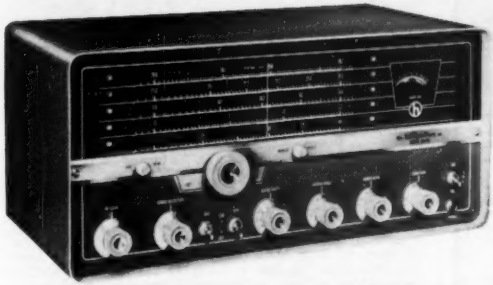
GEORGIA—SCM, William F. Kennedy, W4CFJ—SEC: PMJ. PAMs: LXE and ACH. RM: DDY. The GCEN meets on 3995 kc. at 1830 EST Tues. and Thur., 0800 EST on Sun. GSN meets Mon. through Sun. on 3595 kc. at 1900 EST with DDY as NC. The 75-Meter Mobile Net meets each Sun. on 3995 kc. at 1330 EST with K4YID as NC. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4ZZS as NC. The Atl. Ten-Meter Phone Net meets each Sun. on 29.6 Mc. at 2200 EST with BGE as net mgr. The Georgia S.S.B. Net meets each Mon. through Fri. on 3970 kc. at 2000 EST with K4RHB as net mgr. The Atlanta Radio Club Net meets at 2100 EST on 21.36 Mc. each Sun. with DOC as NC. The Chattanooga Radio Club has invited all the Georgia hams to its Division Convention to be held in Chattanooga, Tenn. Apr. 7-8-9. MKN is mobile on 80- and 20-meter c.w. and checks into GSN from his car. K4VHC is sporting a new AF-67. LNG finally worked 8PT in Michigan after over a year of 144-Mc. skeds. It was a meteor contact during the Geminids shower. He was LNG's 19th state on 144 Mc. Congratulations to Jack Nelson, who recently became K4TJN, and C.W. Hunt of MARS Radio, T.A.F.B., who now is TGE. Both are ready to go on the air. Our hearts are saddened to hear of the death of the XYL of K4PGZ. The Albany, Ga., Amateur Net now meets at 1530 instead of 1500 EST. The Atlanta Radio Club has set June 3 and 4 for its hamfest. Traffic: K4BAI 238, BVD 131, OGG 56, W4MKN 38, K4VHC 12, TEA 2.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: KP4AAA. This is the last report from KP4KD before he joined Silent Keys on Dec. 18. "Got cards for WPR500, need one more for WPR-N—80 and not doing so good for WPR25 50-Mc. certificate as only received

(*Continued on page 124*)

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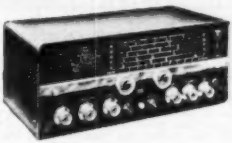
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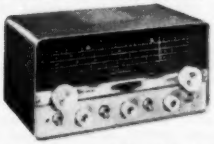


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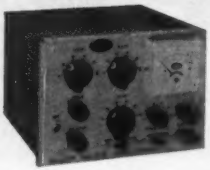
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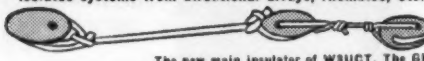
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17 cards for 27 QSOs. Received Connecticut Wireless Assn. certificate for copying W1NJM's 40-w.p.m. transmission on 7 Mc. Got the AC-15-Z, W-21-M and RX for African YL KKK-500. Worked All Scandinavia, Worked 50 SM-5 and 2 band R6K certificates. Doing OK on the Certificate Hunters Club 'Hunt the Hunter' with 37 worked, enough for certificate and 13 more will get a '50' sticker. Worked 55 different countries in the CQ DX Contest and then knocked off 350 W/K contest QSOs in five hours of snappy brass pounding. Worked VP2VB at Clipperton FO8AN and FF7 in Mauretania and a 9U5 in Ruanda-Urundi for DXCC 267 worked, 259 confirmed. Now have a four-element yagi for 6 meters." AWH participated in the Sweepstakes for 7½ hours and worked 35 sections in 77 contacts, and just finished the Heath Sixer. CC is the first KP4 winner of the Worked All Connecticut Award for c.w. RA sends greetings from Rome, Italy. WT was heard on the Voice of America amateur radio program on Dec. 2, where she was interviewed. AYA is a new station on 50 Mc. with a Heath Sixer from Caguas. ANQ moved to San Juan from Ponce and is on 50 Mc. with a new G76. ALC has an Apache, a Mohawk, an SB10 and a Hornet Tribander beam. AXP and AOR are two more on 50 Mc. DJ received an HT-37 for Christmas. KD's son BJ now uses father's station to continue the sked with other son K4PUJ. AOD handled traffic on Christmas for the brothers at Colegio San Jose. GP moved to San Juan from Arecibo and has a new SX-101A. CH is coming back to ham radio via a Heath Sixer and a four-element beam; his son is studying for his Novice Class license. QM is now an electrical engineer. AOD has a Globe 755A v.f.o. for the Globe King. K4IIF and KP4AEB visited WT. Traffic: (Dec.) KP4WT 104, AOD 160. (Nov.) KP4AOD 90. WT 64.

CANAL ZONE—SCM, Thomas B. De Meis, KZ5TD—The Crossroads ARC had a barbecue on Dec. 29 with a good turnout. Open house was held for New Year's Day to handle traffic for the States. The Canal Zone Amateur Radio Association's new officers are TD, pres.; KR, vice-pres.; PR, treas.; GS, secy.; and SH, act. mgr. SH is showing the boys his new Drake 2A receiver. KR is going s.s.b. with a newly-ordered HT-37, a Drake 2A a Hy-Gain Tribander beam. JT is putting up three-element 10- and 15-meter beams, using a DX 40 and an SX-28 until his new Drake 2A comes in. SW now is active from Rousseau with his KWM-2 and Tribander beam. TS is temporarily inactive because of receiver trouble. AT has moved to new quarters and will be on again as soon as his quad is up. W3LGY eyeballed with TD and had some fun working from HP1GA while on a few weeks vacation this way. The AREC Net schedule now is set at 1430 GMT Sun. on 7225 kc. JW is using a 75A-2 receiver and a new triband beam. Traffic: KZ5JW 291, UR 81, AD 77, BK 75, OB 48, TD 33, VF 21, CD 12, FG 9, OA 6.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: W6LIP. PAMs: W6BUK, W6ORS and K6PZM. RM: W6BHG. The following stations earned BPL for December traffic: K6LVR, K6MCA, W6ZJB, W6GYH, K6EPT, W6WPF, W6SYQ, KØCLS/6, K6OZJ, W6BHG and WA6INR. Congrats, fellows! W6NKR has a converter in the car. K6COP designed and built a new electronic key. New officers of the So. Calif. V.H.F. Radio Club are WA6AJT, pres.; K6JQB, vice-pres.; W6TNJ, secy.; WA6CDV, treas. WA6DWP had a nice trip to Tucson and Phoenix. K6KUU was QRL with the Christmas rush at the Post Office. W6FB visited 6th Army MARS and several stations up north. K6EA is back on the West Coast again! KØCLS/6 is back in Iowa for a spell. W6SRE still is traveling around the Coast. K6SIX reports several 6-meter openings. WA6GHW is working out fine on 1215 Mc. K6PZM has been appointed PAM and net manager of the SoCal 6 Net. Congrats, Joe! New officers of the Inglewood Amateur Radio Club are WA6AZM, pres.; K6HCY, vice-pres.; W6AQB, rec. secy.; W6PFE, corr. secy.; K6MLJ, treas.; W6RKU, sgt. at arms. WA6HUO is doing real fine on 40 meters. W6LYG is getting back into traffic. The Los Angeles section came out fine in Field Day with three firsts—W6JBT/6, K6DTA/6 and W6RW/6! Support your section nets: On c.w., the Southern California Net meeting at 0300 GMT on 3600 kc.; on phone, the SoCal 6 Net meeting at 0300 GMT on 50.4 Mc. Traffic: (Dec.) K6LVR 3502, K6MCA 2182, W6ZJB 1607, W6GYH 1217, K6EPT 1088, W6WPF 1080, W6SYQ 798, KØCLS/6 630, K6OZJ 607, WA6DJB 392, K6QPH 378, K6BAY 285, W6BHG 278, W6LYG 154, W6USY 144, WA6DWP 125, WA6CKR 122, WA6INR 108, K6SHZ 102, WA6DCZ 98, K6SLX 84, WA6KQN 64, WA6JOC 49, W6BUK 10, W6CK 10, WA6HUO 6, WA6AWD 3, W6NKR 2. (Nov.) W6SYQ 178, WA6DJB 159, K6PZM 72, W6ORG 10.

(*Continued on page 126*)



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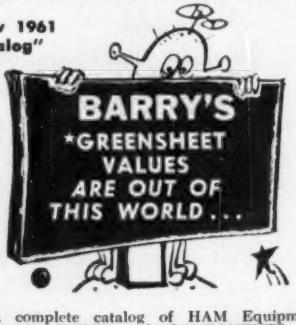
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ARIZONA—SCM, Kenneth P. Cole, W7QZH—PAM: OIF. RM: LND. The Copper State Net meets at 1930 MST. Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. The Catalina Emergency Net has been dissolved. After four years of functioning as an efficient communications team which worked hand-in-hand with and gained recognition by the Pima County civil authority and gained the respect of the community, the action taken by the Catalina Radio Club comes as a surprise. This action apparently was taken because the radio club is sponsored by the Hughes Employees Association. Club membership henceforth will be limited to these employees and members of their immediate families. An independent civil defense communication system soon will be formed to take the place of the Catalina Emergency Net. The Arizona Amateur Radio Club held "open house" for the general public at the Bayless Country Store in Phoenix. Four working transmitters were on the air and over 400 Christmas messages were accepted and sent to relatives or friends within the continental United States and to APO or FPO addresses. Six years ago we used only one rig. This year, demonstrations of a.m., s.s.b., c.w. and TTY were set up for public viewing. GQ built up and demonstrated early television—1928 vintage. Between 350 and 400 attended the amateur Christmas Party in Phoenix. A new call is K7JYI, of Flagstaff. Traffic: W7LND 167.

SAN DIEGO—SCM, Don Stansifer, W6LRU—New officers of the South Bay Amateur Radio Society are K6BUM, pres.; K6UJF, vice-pres.; WA6CBN, secy.; WV6MCF, treas. Heading the TVI Committee is W6NSC. W6WNN, long-time DX-er on a.m. phone, has now gone s.s.b. He also is very active on 2 and 6 meters. WA6BUX is up to 70 countries, and started the New Year with a 75A-1 receiver. K6BHM, in the Coast Guard, has been stationed in San Diego and has a new tower and beam. A special meeting of the San Diego DX Club was held at the home of W6LRU in late January, with W1WPO from Headquarters as the guest speaker. The W/K6 Bureau, operated by the DX Club, sent out over 40 pounds of cards during the two weeks after Christmas. W6CHV is converting to s.s.b. with a homemade generator to increase his 214 phone country total. New officers of the San Diego DX Club include K6EC, pres.; W6CHV, vice-pres.; K6TXR, secy.-treas. The December meeting was held at the home of W6CAE, where W6JH showed slides of his recent trip to Europe. W6KSM continues to knock off new ones with his linear final and KWM. Traffic: W6YDK 4258, W6IAB 4130, K6BPI 1987, WA6CDD 614, W6EOT 429, K6LKD 303, WA6ATB 214, K6TFT 50.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR—OOs: W6ENR, K5TQW/6, W6YCF, W6MSG and W6QIW. ORSs: W6OUL, W6YCF, W6JPP and K5TQW/6. OPSs: W6IHD, W6MSG, W6YCF, W6JPP and W6KLR. OBSs: W6NKT, W6NTF and W6PWK. OESs: K6VDW. K6UOT and K6ARK have come up with a simple 2-meter transmitter that will perform as well as the popular 2-meter Communicator. It is designed to encourage more activity on 2 meters at a very reasonable cost. The Ventura County ARC will supply its members with a 2-meter crystal when the transmitter is built. Santa Barbara ARC's new officers are K6CVR, pres.; K6ARK, vice-pres.; K6KJU, secy.; W6EPL, treas. W6OUL moved his QTH to Lompoc and reported having a ball working Santa Barbara on 2 meters. W6YCF is thinking of going s.s.b. after working W6JPP a couple of times. W6ULS was the featured speaker at the December Santa Barbara ARC meeting. Merle's informative demonstration on how to work DX was well taken. WA6FGV is trying to utilize this for a DXCC. Traffic: W6YCF 36, W6OUL 3.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—K5QOV has moved his radio equipment into a play house in his back yard. I wonder what the little harmonics thought of the move. Art is NCS for the NTEN and a very active OO so I guess the XYL thought it would be a good idea to get him out of the house. LR reports increasing activity on the NTX, but still is looking for more traffic outlets in the State. Gene is doing a fine job and deserves all the support you can give him. Check in on the NTX and get your code speed back up to where it should be. DRJ is a new ham in Brownfield. The Terry County ARC is starting a new code and theory class and is looking forward to a good attendance. The club also has made arrangements for a series of Electronic Film to be shown at its monthly meetings. CUI wants to contact any ham living in Camp County. Milt is ex-KDP and lives in Pittsburg, Tex. CEZ has been acting net manager of RN5 while

(*Continued on page 128*)

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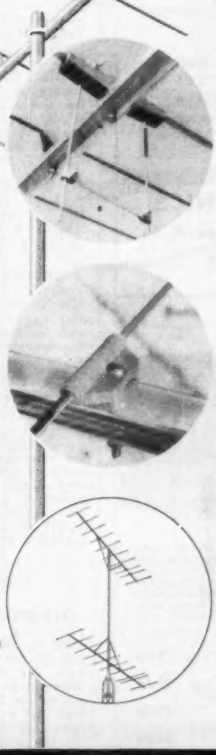
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All Hy-Gain Hi-Banders are ruggedly constructed of heavy wall 1¼" diameter heat treated alloy aluminum tubing booms and 3/16" diameter solid rod elements. They are built to withstand extremely high wind velocities and heavy ice loading conditions. All Hi-Bander beams are optimum spaced, which together with the advanced design high Q solid rod elements result in tremendous forward gain and excellent front to back characteristics. Elements are insulated from and firmly attached to the boom by the exclusive Hy-Gain high impact eycolac formed bracket. Both boom and element ends are plastic capped and all hardware is hot dipped galvanized and iridite treated in accordance with military specifications for maximum weather ability.

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+ 3db Gain

Two Hy-Gain VHF Hi-Bander beams may be stacked to produce an additional 3db gain (equal to doubling the power) with considerable reduction in vertical beam width concentrating maximum power at low vertical angles which are so important in VHF propagation. These stacking kits are complete and include all necessary hardware and complete assembly instructions (less mast). Order by antenna model number. Model DS Stacking Kit $4.95 ham net.

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+ 6db Gain

Stacking four (two by two) Hi-Gain VHF Hi-Bander beams results in the tremendous additional gain of 6db (equal to four times power) together with the all important reduction in both vertical and horizontal beam width. The quad stacking arrangement results in the maximum concentration of radio frequency energies within the mechanical limitations of most amateur installations. The quad stacking kits are complete, including all hardware and assembly instructions, (less mast and mounting frame). Order by antenna model number. Model QS stacking Kit $15.95 ham net.

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GY was off the air because of equipment trouble. GY went on phone in December for the first time and says the thrill was almost as big as the first time he got on the air in 1914. K5IMC has moved to Waco. K5HTM got DXCC. Congratulations, Lannie. MSG has tried for 34½ years to get on 1.8 Mc. and finally made it. DPI, ex-K1MLJ, lives in Borger now. Amateurs in Henderson and vicinity held an organization meeting Jan. 7. Are you wondering about the missing activity report in Jan. *QST*? I didn't receive any news. Traffic: W5LGI 336, BKH 260, K5BKH 197, IBB 92, ZOM 49, HTM 44, SXK 29, W5GY 21, K5PAW 18, IMC 13.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—SEC: K5KTW. The SCM had the honor of officially presenting the ARRL Charter of Affiliation to the Oklahoma Central Six-Meter Club Dec. 20. The Wheatstraw Club has an emergency bus complete with gear and a new paint job. New officers of the Lawton-Ft. Sill Club are RDK, pres., KCB, vice-pres.; FEC, secy., KS, treas. The ACARC also has a new set of officers: RRN, pres.; HXT, vice-pres.; EHC, secy.-treas.; K5QNU, assistant to the president. K5DYW has a new shack. KY has a new Invader, K5MYS a new HT-37 and K5CGD is a new General. Because of the press of time, K5JGZ has had to resign as RM. Thanks from all the gang for a job well done, Lee. OOF will take K5JGZ's place and K5IBZ has been appointed RM for SSZ. The Tulsa Mobile Club Hamfest will be held May 7. K5BNK, HJV, CGE, BQG and BAU, all of Durant, have new 6-meter rigs. K5IXS is a new OBS at Cordell. UYQ, ex-9NLI, received a QSL card from ØTPD confirming a QSO of 21 years ago. TPD is ex-9TPD. By the time you read this the storm season will be almost here. Remember, fellows, a good net is dependent on team play, rather than star play. Traffic: (Dec.) K5CAY 621, IBZ 456, JGZ 268, W5DRZ 252, FEC 140, K5AUX 135, DLP 79, W5MFX 74, KL7CWX/5 70, K5WZJ 67, ELG 59, DUJ 52, ZEP 47, W5KY 37, UYQ 34, K5OOV 32, VNJ 32, YTH 32, DJA 27, WEF 26, CBA 25, INC 21, W5WDD 20, WAF 19, K5LYM 17, W5CCK 16, K5JOA 15, LZF 12, W5PNG 11, EHC 8, K5EZM 7, W5VLW 5, K5PDM 4, W5ADB 2, K5HQE 2. (Nov.) K5DUJ 37.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: AIR. PAM: ZPD. RM: K5BSZ. The 7290 Traffic Net had 45 sessions, 1851 station check-ins and handled 1146 messages. Congratulations to K5WIC and K5MVI on making BPL. AIR is the new Section Emergency Coordinator for the Southern Texas section, replacing QKF, who was elected Director. AIR and QKF visited with the Rosenberg Club. Glad to hear that K5JCC is back on the air after having rig trouble, also K5LIU after moving to a new QTH. Mildred is chasing DX with a new 20-meter beam. Some of the operators in Southern Texas thought they had found a bootlegger, but sure enough it was LRQ back on the air after an extended layoff. Welcome back, Guy. Because of the long spell of rain and cool weather there is very little news from Southern Texas. Everyone was afraid to get out during the Holidays, or at least no one reported it to me. Traffic: K5WIC 891, MVI 789, MXO 174, W5AIR 139, ZPD 113, K5JFP 96, W5AC 79, K5MWC 41, ABV 4.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. D. Solomon, VE1OC, and H. C. Hillyard, VO1CZ. SEC: BL. VO1EX has a 400-watt linear and reports working Europe regularly on 75 meters with s.s.b. He also reports losing all antennas and a 45 ft. tower in recent storms and now has a temporary doublet up for 75 meters. ABT has received his original call, NO, and is active on 20-meter phone. DD has a DX-40 operating on 75 meters and DB has a new antenna up for the same band. The latest Department of Transport list of banned countries is as follows: Cambodia, Republic of Indonesia, Laos, Thailand, Viet-Nam, Jordan, Roumanian People's Republic. Many station appointments are now available. We would be pleased to hear from ARRL members interested in an appointment, especially OES, OO, OPS and ORS appointments. Thank you for the many cards and letters received during my recent illness. Traffic: (Dec.) VO1EX 124, VE1ADH 25, OM 12, DB 4. (Nov.) VE1OM 11.

ONTARIO—SCM, Richard W. Roberts, VE3NG—We regret to announce the passing of three VE3s on Christmas Day, our beloved SEC KM, YR and BZN. Their passing on is a great loss to ham radio and we hasten to extend our deepest sympathy to their loved ones. CJ, our Canadian Division Director, was guest speaker at North Bay. Visitors were HC and CO. The Skywide ARC has an FB monthly paper, BRQ is editor.

(*Continued on page 130*)

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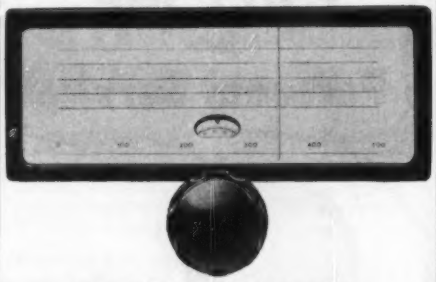
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The Ottawa Ramblers (mobile club) will have new officers soon. The club held a fine social recently. YE has a new vertical. PHQ is s.s.b., DPE is now Class A. The Algoma ABC held an auction. EOV was in charge. St. Clair Valley held a dinner in January. The big prize was a Heathkit HW-19. In spite of the report in this column last issue I wish to inform you that the ARRL Convention for Ontario *will* be held in Windsor in 1961 and *not* in Toronto. DHB and CFY are now on 10 meters. DFU is s.s.b.. SAR is the club station. Sudbury members were visitors to the North Bay Club to hear our Canadian Division Director recently. The Peterboro ARC participated in a communication test in December. BUW was in charge. The Metro ARC of Toronto elected the following: DSM, pres.; RN, vice-pres.; DOQ, rec.-secy.; B. Iseman, corr.-secy.; APN, treas. The Quinte ARC will have new officers soon. EQM is now Class A. A8A had a visitor from Mexico. XE2FC visited many friends in the Toronto Area. EOL got his ticket on his fifteenth birthday. CUM has returned from Europe. DQG is a Late Owl with his 807 Club on 75 meters. DMZ was burned out at Christmas. The VE3s, under NG, KJ, AML and AQL ran a Hamathon and raised a considerable fund. 5GN, Doris, was a visitor to Toronto. EOX is in London, CQI now is Class A. SG was in the hospital. CWA made the BPL. TX is in the hospital—North Bay. QSLs would help. Traffic: (Dec.) VE3CWA 655, DPO 220, BJR 140, NG 138, AIL 74, BAQ 65, CFR 50, EAM 44, NO 43, EHL 39, CYR 31, DH 27, AUU 21, DTO 20, DWN 20, ELC 12, DZA 9, DLC 8.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—CI is now OBS. AGQ and AGM are bolstering the slim C.W. Net participation by reporting into OQN. ER's s.s.b. is very effective. XI and UT are interested in bringing along newcomers; both have fine 75-meter phone sigs. LE/W7 had good luck hamming in Seattle. APR is back after a 6-month lay-off. Your SCM had an interesting QSO with AXY while visiting GM6ITN. The South Shore gang holds AREC drills Sun. on 3765 and 28.250 kc. at 1230. The c.w. boys meet at 1330 on 3660 kc. ACH used to sign VE8TO, VE4CF and GM3HLD. XO, Yamachiche, is back in the swing. The MARC held its usual peppy Christmas Party. YB, while maritime mobiling on icebreaker *Ernest Lapointe*, uses the call VE9ML. QO, ex-VE6AF, is active with homebrew s.s.b. and works friend 3EDR, ex-HX. The DX brigade, NV, YA, YU, etc., are tidying up for the March BERU Test. LI hopes to bring the world to his mountain retreat this spring with a 20-meter quad on top of a new 65-ft. tower. AFZ is the proud owner of a G-76 Gonset mobile. ABE experiments on 20-meters with real QRP, using a CK-762 transistor rig with less than one milliwatt output. EC will be on 2 meters with 35 watts and a ten-element beam. API, Joliette, is planning to return to the air. BCS, from St. Elie de Claxton, near Shawinigan, is active on 75-meter phone. The mobile group cooperated during Army drills at St. Jerome. ADB is trying a conical on 75 meters. AAH and AJF operated from Frontier Lake, near Maine, during the latter part of December. AAD hears DX on 75 meters. Greetings to BHA, a newcomer at Quverney. WT, OQN manager, reports the net is becoming more active. Traffic: VE2WT 252, DR 102, EC 29, BG 15, APR 13.

BRITISH COLUMBIA—SCM, Peter M. McIntyre, VE7JT—Activity for December was at a low ebb. With Christmas and poor band conditions there is not much to report. RM AOT reports the BCEN had a good month except that conditions after 2100 hours were bad. There are reports of VE5 interest in a c.w. net which will help along the formation of a Trans-Canada c.w. net. AQU, the new BCEN recorder, now is in Sandspit. IJB is around again but not back to work as he still is under the doctor's care after a bad fall from a tower which landed him in the hospital and in a cast. Traffic: VE7AAF 170, AOT 64, JQ 41, BAZ 38, BFK 30, AMW 14.

MANITOBA—SCM, M. S. Watson, VE4JY—WS and his XYL are on an extended holiday in the sunny South. FF, of Flin Flon, is on holiday in the southern states. RR, of The Pas, has established frequent contacts with OD, of Churchill, and SW, at Oxford House. 3EDD, of Minaki, is a consistent outlet for eastern traffic. FI, at Kenville, and JQ, FX and QX, of Dauphin, on the Manitoba Net provide a reliable relay between the North and South when conditions get tough. TVI is now creating quite a problem in Greater Winnipeg since Pembina channel 12 came on the air. TV antennas have sprung up like a forest. With the help of ARRL aids and an active technical committee the ARLM hopes to solve the difficulty. IW, at Manitou, and RF, of Lyleton, have reactivated the c.w. net and ask for cooperation from all amateurs. Traffic: VE4PE 30, JY 26, QD 20, EF 17, VE3EDD 14, VE4RR 12, PW 11, AN 6, AV 6, IW 6, TE 4, OB 3, NW 2, RF 2, DU 1, XY 1.

(*Continued on page 132*)

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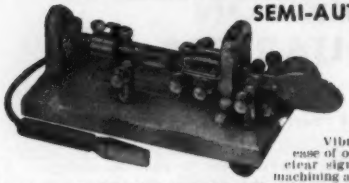
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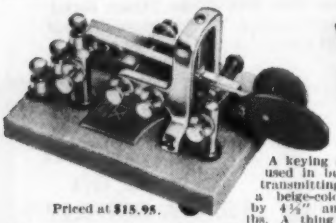
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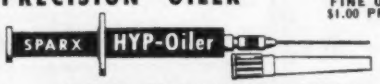
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SASKATCHEWAN—SCM, H. R. Horn, VE5HR—NQ has done a fine job of organizing the C.W. Net. The net will tie in with RN7 of NTS and regular check-ins will result. NQ also has been appointed ORS. The net meets on 3685 kc. at 1900 MST. New calls heard are IK at Saskatoon and JJ at Melfort. Glad to have you with us. DZ added two more certificates to her wall with YLCC and WGSA (Sweden). Nice going, Ebba. MN has a new HQ-145. Our best wishes to AD for a speedy recovery from a stroke. JG sold his KWM-2 and will be on a trip to JA/KA-Land. PP is finishing a new home and will be on again soon. QJ is a new call heard from the RCAF station at Moose Jaw operated by local Air Cadets. OP has far too many old unclaimed QSL cards in the bureau files. If you want yours, please send him the required S.A.S.E. or they are liable to become fuel. The NSARC at Prince Albert now holds regular monthly meetings at 7:30 P.M. the 3rd Tue. of each month at Boy Scouts Hall. Traffic: VE5NQ 21, HQ 20, DS 15, FG 14, SC 13, EO 12, NX 8, BW 4, CB 4, KZ 4, AH 3, CR 3, MS 3, BZ 2, DZ 2, GW 2, NR 2.

Correspondence

(*Continued from page 71*)

Believe me, this is a real department! I got over 26 replies, as far away as Oregon, California and Louisiana, plus a telegram from Colorado. They came from 10 different states and I sold out everything in 3 days. Now I ask you: how could anyone go wrong with a subscription to *QST*? — *Fred H. Chase, K1KVB, Topsfield, Massachusetts.*

GMT HELPS!

¶ Congrats on your recommendation on using GMT. I never did, but now I have started and find it better! — *Tom R. Horton, K5IID, Fort Worth, Texas.*

FIRST THINGS FIRST

¶ I want to tell you how happy I was to read the first two paragraphs of Operating News in the January 1961 issue of *QST*. There is nothing like starting the new year in the right direction, and code proficiency, it seems to me, is the indispensable foundation which should be laid before we specialize in one of the many interesting branches of our hobby.

Just as, in the Marine Corps, every man must become expert with the rifle before he is assigned to any sort of technical training, so should every ham be an expert *communicator* before he takes up construction, sideband, v.h.f., traffic, DX or what have you. For after all, ham radio *is* communication, and all its other aspects develop from or contribute to that end.

Let's have more emphasis on code proficiency, more articles about how to get code proficiency. Let's add an unwritten seventh article to The Amateur's Code: THE AMATEUR IS A GOOD OPERATOR. — *Horace Butterworth, K3AKB, Washington, D. C.*

¶ The "Operating News" discussion of the poor showing by over two-thirds of the applicants for General Class in the code test was very timely.

The writer attended a General-Class examination a few weeks ago and was amazed to see that less than 10 out of perhaps 30 managed to copy 65 consecutive characters of that inexorable 13 w.p.m. cranked out by the tape machine.

That FCC tape is *good* International Morse. It doesn't falter, halt, boggle, reiterate or recant; it just keeps moving relentlessly along. But if you've been copying up to 20 w.p.m. on W1AW or some of the commercial stations that tape will sound like a familiar friend and you will copy it solid. — *Jay F. Antenen, W8SDQ, Hamilton, Ohio.*

YL News and Views

(*Continued from page 64*)

YL-VHF Contest — sponsored by the YLRL, April 12 and 13. See rules in this column.

Third California YL Get-Together, May 12, 13, and 14 at the El Cortez Hotel, San Diego. Contact W6VSL for details.

CLUBS:

BAYLARC — New officers are Pres. WA6JGR; V.P.

(*Continued on page 134*)

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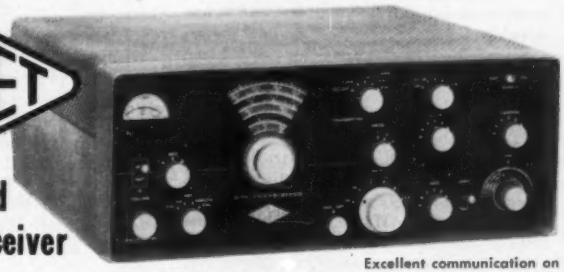
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West Hartford 7, Connecticut

(*Continued from page 132*)

W6QYL; Treas. K6CUV; Secy. K6ZRC. Board members are W6BDE, K6HIW, WA6ALK, and WA6GQC. Membership is up to 62 YLs. K6ZCR has been named custodian of the club's new Mermaid Certificate. Work 6 members and send copy of log to K6ZRC, 537 Valverde Drive, So. San Francisco. Mermaid net meets Sat. at 10:00 A.M. PST on 3850 kc. with W6QYL NCS.

Floridora YLs — Corrections from K4RNS: the Monday phone net at 0900 EST on 7225 kc. is known as the Floridora YL net (not the Bustle net) and K4RCX is NCS for the novice net, Friday, 0900 EST, 7185 kc. The club now conducts a total of seven nets.

WAYLARC — Date and time of the club's regular meetings have been changed to the first Saturday at 2:00 P.M. in the Museum of Natural Arts. All YLs in the Washington, D. C., area are cordially invited to attend.

Camellia Capital Chirps — New officers are Pres. K6ENL; V.P. K6DLL; Treas. K6HHD; CHIRPS editor K6ENK. Custodian of the Chirptificate is Jane Willis, K6RLR, Chico, California.

— ... —

K4RNS, Marge, should have been included in the list in the January column of YLs who made BPL during 1960.

Build a Monilator

(*Continued from page 43*)

volume, then shorten the lead, six inches at a time, until you have the desired amount of signal. If you can't get a tone, try grounding the pickup lead. The monitor should work properly on all bands from 80 through 10 meters. If you want to use phone, simply place the mode switch in the oscillator position to disable the Monilator.

Monilators are in use at both K9OMO and K9LYH. My greatest thanks are due to Bob McGinnis, K9LIZ, for his encouragement and his help with the photography. QST

Power Converters

(*Continued from page 45*)

positive-ground system insulating material must be used between the transistors and the mounting plate. The insulating washers should be very thin to preserve good heat transfer. The 30-amp. fuse, control relay K_1 and the L_1C_3 filter must then be connected between the negative battery terminal and the collectors, and the polarity of C_3 must be reversed. In addition, the ends of R_5, C_1, and their counterparts in the l.v. supply which are shown grounded must be connected to the collectors instead.

Construction Notes

The high- and low-voltage supplies can be built on separate chassis as shown in the photo or combined into one unit. Layout and construction are not at all critical except that the transistors must be mounted on suitable heat sinks. These can be sheets of aluminum fastened to the chassis sides as illustrated. Each pair of transistors in the large supply requires at least 80 square inches of $\frac{1}{8}$-inch thick aluminum or half that area when two $\frac{1}{8}$-inch thick sheets are sandwiched together[8].

The emitter resistors are homemade, using resistance wire. First, two pieces of the wire should be cut to length for 0.2 ohm resistance. Then

(*Continued on page 136*)



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No pictures or new equipment releases this month—we have taken inventory and we are concentrating on reducing it—so our loss is your gain—contact us fast—most are single items and subject to prior sale—list second and third choices. Happy Hunting and 73—Uncledave

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NC98	98.00
RDF66	15.00
NC66	50.00
NC173	125.00
NC125	115.00
HRO50T	250.00
HRO60	395.00
NC183	75.00
NC188	100.00
HFS w/P.S. (30–250 Mc.)	125.00

TMC

GPR90 w/spkr. Xcellent cond.	$395.00

HALLICRAFTERS

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R46	8.00
S40B	49.50
S38D	39.50
SX99	99.50
S38E	49.50
SX62	99.50
S38C	34.50
SX71	125.00
R46A	8.00
R46B	12.00
SX62A	269.50
HT32A	595.00
HT31	195.00
HT32	495.00
HT33	550.00

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Tri-Band Conv.	30.00
3–30 Conv.	30.00
G50	225.00

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RME—E/V

MC55 Conv.	$ 25.00
4301	49.50
45	79.50
DB22A	39.50

ELMAC

PMR6	$ 75.00
AF67	114.50

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32V3	$375.00
KWM-1	750.00
KWM-1 (With Noise Blanker, DX Adapter, Speaker) complete (As above)	$895.00
75A4	595.00
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32V2	275.00
351D1 (Mount for KWM-1)	49.50

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Mobile	69.50
122 VFO	39.50
Thunderbolt	450.00
Viking 1—with VFO 122	$175.00
Valiant	350.00
Viking I	150.00
Ranger	195.00
Pacemaker	375.00
K.W. Amplifier w/desk	995.00

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300	295.00
DSB100	74.50
90A	65.00
666 (VFO)	39.95
680A	79.50
LA-1	85.00

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DX100B	195.00
IT-1	18.00
MT-1, MR-1, AC P./S., DC P./S., MTG Rack, Spkr. & Mic.	450.00
VF-1	15.00
QF-1	7.50

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G77A (No P.S.)	$125.00
2 Mtr. VFO & Preamp	49.50

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AF67	$149.50
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Adventurer Kit	45.00
500 (Kit)	649.50
10 Watt Amplifier (K)	55.00

NATIONAL

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DSB-100 (Kit)	79.50
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VOX-10	19.50
QT-10	5.95
PA-1	7.95

LAKESHORE

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P1 (P.S.)	12.50
CC5/220 Conv.	29.50
CC5/50	29.50

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51S8 (SSB unit)	195.00

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Mosley VPA1020 (New)	99.50
Telrex 3 El. 20 Mtr. (Used)	49.50
Telrex 3 El. 10 Mtr. (Used)	39.50
Mosley V144GP (2 Mtrs.) (Used)	17.50
Mosley VPA20-2 (New)	39.50
5A-6M Taco (New)	9.95
10A-6M Taco (New)	17.50
BA6M (Baluns-for-Above)	3.95
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Hy-Gain HH-6 (6 Mtr.-Halo) (New)	9.95

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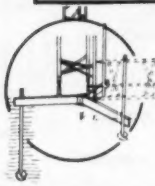


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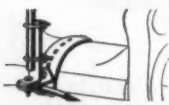
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(Continued from page 134)

loops are formed at the midpoints of the wires, and the wires are wound on ½-inch diameter hardwood dowels. The center loops are connected to the transformer taps, and the ends go to the emitters.

This dual power supply has proven ideal for running a 50-watt transmitter. Of course, the low-voltage section could be used to operate the receiver as well. Our supplies are mounted in the car trunk away from the heat of the engine. A length of No. 6 insulated wire is used for the battery lead. The 30-amp. fuse is located at the battery end of this cable.

We wish to thank Bob Osborne, W8ZM, for both material and advice in connection with this project. QST

[3] The 2N278 transistors (Delco type DS501) should be available through Delco automotive radio distributors. The matched pair is Delco type DS506. If the local dealer does not stock these units, the location of the sales agency nearest you may be obtained from Delco Radio Division, 700 East Firmin St., Kokomo, Ind. — *Editor.*

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

W1BCG, Cedric W. Root, Old Saybrook, Conn.
K1CKH, Henry P. Holmes, Plaistow, N. H.
W1FO, George H. Rodick, Cape Elizabeth, Me.
ex-W1ICI, Harry G. Wyer, Brookline, Mass.
W1MOM, Gordon B. Ruggles, New Bedford, Mass.
W1MQP, Raymond E. Mathewson, New Britain, Conn.
W1ZOP, Charles J. Montani, Saxonville, Mass.
W2GVZ, J. P. Jessup, Glen Rock, N. J.
W2JUG, Wallace H. Rohlfing, jr., Edgewater Park, N. J.
W2PGT, Harding A. Clark, Manlius, N. Y.
W2PNY, Joel L. Crandall, Buffalo, N. Y.
W2ZPQ, Charles T. Westervelt, Queens Village, N. Y.
W3LWW, Donald A. Henry, Greensburg, Penn.
W3VWV, Edward J. Young, Monroeville, Penn.
W3ZTY, Doris C. Stephan, Manchester, Md.
W4EI, Charles W. Glover, Marion, Alabama
W4OZL, James K. Wood, Greenville, S. C.
W4RYE, Charles W. DeRemer, Alexandria, Va.
K4SBL, Joseph A. Gaslin, Louisville, Kentucky
W4UMF, Thomas B. Blevins, jr., Falls Church, Va.
W5BMC, Milton M. Brownlee, Madisonville, Tex.
W5NFT, J. T. Martin Smallwood, Longview, Tex.
W6KGR, Louis Gard, Quincy, Calif.
K6LKI, Archie I. Moore, sr., Alhambra, Calif.
W6PU, Gerry K. Essex, Albany, Calif.
K6RQR, Loran L. Salisbury, Huntington Park, Calif.
W6VRU, Frank A. Fleming, Hollywood, Calif.
ex-KN7EXY, Sanford C. Bashor, Longview, Wash.
W7JJQ, Edwin G. Engelbert, Wendell, Idaho
W7PYZ, Clarence L. Burgess, Kevin, Mont.
W7TCL, Harry Zadorozny, Burley, Idaho
W8MF, Ezra L. Saunders, Battle Creek, Mich.
W8NJH, Stuart C. Rockafellow, Plymouth, Mich.
K8PKD, Weldon F. Soddy, Lansing, Mich.
W8PUN, Clarence W. D. Hall, Chillicothe, Ohio
W9MAT, Louis H. Brown, La Grange Park, Ill.
K9QXR, William F. Sinclair, Indianapolis, Ind.
WØFFU, Cy B. Woods, St. Paul, Minn.
WØQXO, Paul A. McCreery, Columbia, Mo.
VE3AVK, Jack Crosby, Hamilton, Ont., Canada
VE3JK, Harold F. Jackson, Ottawa, Ont., Canada
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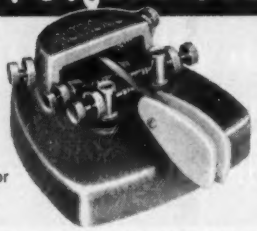
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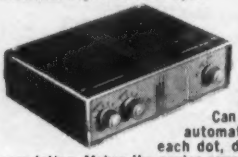
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DX and Single Sideband

(Continued from page 61)

Why not extend this principle so that DX is 1) easier to work, 2) easier to find, and 3) less likely to be the cause of QRM caused by stations calling the DX.

Here's the idea.

1. On 10, 15, and 20 meters, where upper sideband is used primarily at present and where most DX is worked, *lower* sideband should be used for *international* (i.e., DX) contacts.

2. On 40 and 80 meters, where *both* upper and lower sidebands are used, *lower* sideband should be used for international contacts.

That's really the whole story. How would it work in practice? Well, in the first place, the DX station wishing to work out would call CQ DX on *lower* sideband. This makes him just that much easier to find. Even better, once he's working the gang they will cause *less*, although by no means no interference to normal QSOs because *they'll* be on the lower sideband. Furthermore, the job of sorting out answers from regular QRM will be much easier for the DX station. In effect he'll be listening only for a sideband that is calling him. One other point. DX stations wanting just to ragchew can go over to upper or "local" sideband.

All right, objections please. First, how are you going to get all DX stations to go on lower sideband? Answer — if a few try it and it helps them, others will try it. So why not give it a try if you *are* DX, or ask the DX station to switch over if you're working him. Second objection, what about DX stations with KWM-1s who can't get on lower sideband. Answer — they'll have to be included out, pending popularity of this plan (which we'll call the Lower Sideband DX Plan), in which case it's almost no job to convert the KWM-1 to lower sideband. The point is, the Lower Sideband plan doesn't have to be 100% effective, or even have 100% participation, to help a lot . . . to make DX easier to find and work and cause less QRM in the process. QST

Strays

Here's the March schedule for the AF MARS Eastern Technical Net (1900 GMT Sundays on 3295, 7540, and 15,715 kc).

Mar. 5 — Physics and Chemistry of Pure Metals.
Mar. 12 — Semiconductors.
Mar. 19 — Thermionic Power Generation.
Mar. 26 — Thermonuclear Power.

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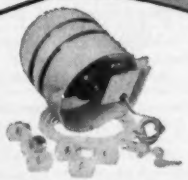
The Third Army MARS training schedule continues on 5850 kc. A4EHU will discuss sideband beginning at 0001Z on March 3, 10, 17, 24, and 31.

—•••—

A coincidence to end all coincidences. WA2NYO said he was working WØNYO, and at the same time could hear W4NYO and WV6NYO CQing.

BULLSEYE BUYS at ARROW!

ZIMCO THEFT ALARM

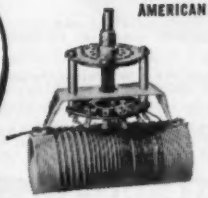


Protect your radio gear in cars, boats and trucks with Zimco's burglar proof siren alarm. Unit consists of tamper proof siren and latching relay, key-operated on/off switch and 6 push button alarm switches. See QST Jan. '61, page 27.

Complete kit, 12 VDC **59.95**

6, 24, 32 VDC & 115 VAC models available on special order.

AMERICAN GELOSO PI TUNING COILS



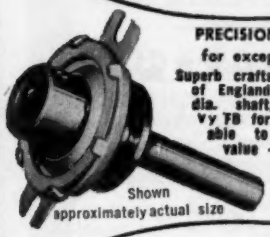
Units have 6 posit. tap switch mounted on ceramic coil form. Mod. 4/111 designed for use with two 807's or 6146's (in parallel). Freq. Range 3.5 to 29.7 mc.

Mod. 4/112 is designed for use with single 807 or 6146. Handles up to 60 w. Range: 3.5 to 29.7 mc.

Mod. 4/111 or 4/112, each $4.95

PRECISION PLANETARY-VERNIER

for exceptionally fine tuning

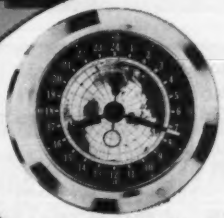


Shown approximately actual size

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. shaft, 1½" long, 6:1 ratio, Vy TB for fine tuning. Easily adaptable to any shaft. Comparable value — $5.95.

Amateur Net $1.50 ea.
10 for $13.50

24 HOUR CLOCK



24 hr. chrome plated 8" metal wall clock. Inner dial with south polar projection map of world indicates time around world. Polar projection dial adjustable for various time zones. Shpg. wt. 2 lbs.

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tax inc.

220V. 50 cycle model.....9.95



"Wonder Bar" 10 Meter Antenna

As featured in Nov. 1958 QST. Complete with B & W 3013 Miniductor. Only 8 ft. long for 10 meters. Wt. 5 lbs.

Amateur Net $7.85

COMANCHE SIGN



Controllable, illuminated sign that tells the XYL and guests you're transmitting. Cuts down background QRM. Can hook right into coil of antenna change-over relay for controlled "ON THE AIR" signal when XMTG. Heavy gauge all steel construction with handsome black or gray baked finish. Can be used on desk or tabletop or mounted directly on wall. Dimensions 10½" long x 3½" high x 3" deep. Specify desired finish in black or gray and operating voltage: 6 or 12 VDC, or 110 AC.

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Versatile Miniature Transformer



Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

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3 for $3.49 10 for $10.75

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Model 124H **22.50**
plus applicable tax
10-minute repeating timer buzzes warning to sign in your call letters.
Walnut or ebony plastic case, H 4", W 7½", D 4", Wt. 3 lbs. 110V 60 cy. AC. 1-Yr. guarantee.
12 Hour System #112 . . . 17.50



At Your Dealer . . . or WRITE to
PENNWOOD NUMECHRON CO.
7249 FRANKSTOWN AVE. PITTSBURGH 8, PA.

World Above 50 Mc.

(Continued from page 59)

WA6BFC — Setting up new 144-Mc. station.
K6SIX — Active on 50 Mc.
K4DZP — Working on v.h.f. a.s.b. rig.
K1CS8 — Observed 50-Mc. E_s opening on December 5.
WA6GHW — Active on 1215 Mc.
K6TVC — Experimenting with 50-Mc. ZL-special. No good results so far.
W4YRM — Extending 50 Mc. antenna to 50 feet. Working on 144-Mc. exciter and amplifier.
W7MAH — Active on 50 Mc., observed openings to 4, 5, 6, 7, and 8 land on December 6.
WA2HTW — Mapping 6-meter dead spots for Civil Defense headquarters station.
K1INL — Working on 50-Mc. mobile transmitter.
K7BBO — Active on 50 Mc. Attempting to break the long QSO record.
W7ZVY — Working on two-meter converter.
K9GSC — Working on a.s.b. converter for 50 Mc. Suggestions welcome.
W8PBA — Observed 144-Mc. aurora on December 7, good ground-wave opening on December 27. Working on linear amplifier and high level mixer for 144.
W8PT — Active on Geminids meteor shower. Worked Georgia for state number 37 on 144 Mc.
K8NEY — Active on 50 Mc., holding nightly schedules with W8UMF with 98 per-cent reliability to date.
K8BGZ — Working on 144 Mc. a.s.b. gear. Contacted KP4AIS on December 18.
W8NOH — Building g.g. 6CW4 for 220 Mc. Active on 50 and 144 Mc.
K1KUY — Building 50-Mc. mobile converter.
K1AII — Monitoring WWI, Havana, Illinois, on both tape and paper.
W1FVV — Tropo opening to Florida on December 11.

Strays

Uncledave, W2APF, has embarked on a new phase of "Operation Goodwill." By telephone he takes messages from relatives and friends of men in the armed forces, records them on tape, and then mails the tape to the service man together with a set of instructions which explains to the man how to listen to the tape and then record his own message and return the tape to Uncledave. When Uncledave gets this tape back, he phones the relative or friend and plays the message for them. In advance of the *original* mailing of the tape to the service man, an amateur radiogram is sent off to him via W2APF and W4LEV (the Marine Corps station at Camp LeJeune, N. C.). Uncledave tried to run this whole operation himself at first, but was flooded with messages. Again, the Marines to the rescue, and now four of them assist him with the deluge. Uncledave bears all the expense. Truly, an operation of good will.

FEEDBACK

A call was listed in error in Silent Keys last month. Instead of W6AU, it should have been K6AU.

YES, WE AND THEY SURE
HAVE COLLINS—WILL TRAVEL
Get in touch with WILSON — "That's All"
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Radar; HF Long Distance or Meteor-burst Communications Systems; Scatter Systems; Propagation Prediction; Ionospheric Sounder Operations; RDF Systems; Short Wave (Amateur) Radio.

Interested engineers must be willing to accept assignments in areas where dependents are not permitted for periods up to one year. Differential paid for overseas assignments.

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Light Weight

10 METER—3 Element . . $28.50
Model No. A28-3, boom 10′ x 1½″
10 METER—4 Element . . $42.50
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20 METER—2 Element . . $45.00
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Model No. A14-3, boom 20′6″x1⅝″

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CUSHCRAFT 621 HAYWARD ST. MANCHESTER N. H.

Strays

A sort of MARS hamfest will be held on March 10 at 1900 at the non-com club at Elmendorf AFB, Alaska. All Air Force MARS members and their immediate families are invited. Dinner, dancing, and a fine time promised for all. Reservations must be in by March 5 (We wonder whether *QST* reaches Alaska by March 5, but word of this party wasn't received at *QST* until January 30, just barely in the nick of time even for this issue!) For more info, contact AK1AIR.

—···—

The Washington (D. C.) Television Interference Committee (WTVIC) has published a TVI aid entitled, *Television Interference Aids, General Review of TVI Causes, Effects, and Solutions.* It includes a quantity of photographs and descriptive material furnished by W1DBM. Copies of the pamphlet are available upon request by sending a self-addressed envelope, stamped with 6¢ for third-class mail or 16¢ for first-class mail, of a size 9 by 12 inches, to Harold R. Richman, W4CIZ, Editor, WTVIC TVI Aids, 1110 Lake Boulevard, Annandale, Va.

—···—

Two-meter hams in the Southern California area were treated to an unusual experience on the day of the Tournament of Roses parade in Pasadena. WA6IUQ, riding in the winning Burbank float, worked the two-meter gang in the area by way of the K6MYK repeater on Mt. Lee. — *K6IPR.*



Mr. Paul Penfield, left, advertising manager for the Detroit Edison Company and chairman of the 1961 Michigan Week Public Relations Board, looks over the program developed by K8JED, seated, who is chairman of the Michigan Week Amateur Radio Operators. Each of the state's 6000 hams will be given a "fact book," enabling him to spread the good word about Michigan during the week of May 21–27. Certificates of achievement will be awarded to those Michigan hams who list 15 or more out-of-state QSOs during Michigan week. These certificates will also be awarded to any out-of-state amateurs who submit lists showing they worked five or more Michigan amateurs during the week, and to any foreign amateurs who send in their QSLs and indicate that they have worked a single Michigan ham. (Real rough for a VE living in Windsor!) Submit your applications to K8JED prior to July 1.

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6 to 80 meter TRANSMITTER

by AMATEURS EVERYWHERE

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THIS opening exists because a client is discontinuing factory sales coverage of his Eastern Sales District. The potential there is now growing so fast that they can no longer keep pace with it direct from the Home Office in Boston. Our client is a design pioneer with a worldwide reputation for quality products, delivery, and service.

IF you have a sound electronic engineering background combined with demonstrated sales engineering success in the New York area, we will be glad to hear from you. Career applicants only, please. We are not interested in talking with anyone on a trial basis. Client will provide thorough training at the Home Office.

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NEW YORK, N. Y.

With ZS1RM/ZS1OU in Basutoland

BY LAUREN L. McMASTER,* K2QXG

THE DXpedition of ZS1RM (Marge) and ZS1OU (Jack), operating from Basutoland using portable equipment, proved to be quite successful in spite of very poor conditions. The gratitude of all those fortunate enough to work them is shown by the flood of cards received with the many notes complimenting them on the fine operating. Just how much it was appreciated is indicated by the fact that 116 W/K thanked them for a new country, and there were probably more.

As for a detailed story of the expedition, there is little to tell. When asked to furnish incidents of interest, Marge, ZS1RM, answered by saying it was very routine with nothing exciting and no hardships experienced — just operation from a rare country for those who might need it, especially those wanting a new YL country.

From this side of the world it is quite a different story. When the results are tallied, it reveals an exceptional operation under conditions anything but favorable. Band openings to the States were unpredictable and rarely satisfactory. They would screen the band to find nothing coming through. Then suddenly it would open and they would work like demons knocking off contacts. The band would go out just as suddenly as it opened. Marge said it was so bad that oftentimes she would return a W/K call reporting a 579 signal and when she would listen for his report his signal would have vanished. The band would stay open for an hour, fade out, and suddenly open again.

They were equipped for operation on 14, 21 and 28 Mc., but the only band at all consistent

(*Continued on page 146*)

* P. O. Box 206, Brightwaters, L. I., N. Y.

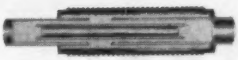


It doesn't look as though this pair of DXpeditioneers had suffered particularly. As a matter of fact, we don't even know whether they journeyed by jet or mule to reach their destination, and we don't know whether they operated from some dank cave or a plush hotel. But we can see why ZS1OU voted ZS1RM the gal he'd most like to go on a DXpedition with.

IN STOCK COMPLETE LINE OF hy-gain

HAM and CITIZENS BAND ANTENNAS





Terry W9DIA

Doc W9HJS

Steve W9EAN

Sandy W9BTN

Earl W9LUQ

Fred W9TRU

Dick K9IFF

Bill K9KKL

The TH-4 THUNDERBIRD

High Q Slim Traps result in a minimum element loading and true full size performance. Longest element 32 ft. Full size elements and full sized boom spacing of 16 ft. allow this beam to operate within theoretical size limitations producing maximum forward gain. The beta matching system is completely factory pre-tuned and requires no further adjustment. This system permits design of array for maximum gain and F/B with no compromise for matching. Exceptional bandwidth maintains lows SWR over entire band, at resonance 1.05 on 10M, 1.15 on 15M and 1.1 on 20M. Dipole shunt fed with 52 ohm coax. Interlaced 4th Element makes possible choice of optimum spacing on all 3 bands.

Wt. 38 Lbs. $117.50

The ROTO-BRAKE, RBX-1

The Roto-Brake utilizes high carbon machined steel gear and rack, reinforced aluminum castings and massive construction throughout . . . Powerful high capacity starting torque motor assembly. Limit switches at due North prevent continuous rotation . . . Safety switch on brake allows motor to be energized only after brake is released. Mounts in steel tower with 10-18" inside clearance . . . Kits available for side mounting on small towers and pole or pipe masts.

$199.95 Complete

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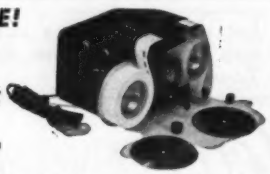
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Housed in Aluminum Case. Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycles A.C.

Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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was 14 Mc. Operation started at 1500 GMT on Oct. 8 using 14 Mc., but in five hours they had only worked 29 Americans. On the 9th they started at 0545 on 14 Mc. but only two W/K contacts were made. At 1347 they attempted 21 Mc. but their only contact was a KG6. At 1500 they found 28 Mc. open and they made 41 contacts, but that was the last opening on that band, with only 6 more contacts being made through the 17th. Of the 860 W/K contacts 47 were made on 28 Mc., 53 on 21 and the rest on 14 Mc.

Lacking the spectacular, the story of this expedition offers little more than the opportunity to summarize details which should be of interest to W/K hams and which should guide them in hunting future expeditions in the area. In the 100 hours of operation open to the States, they made 860 W/K contacts. Their total score was 1531 contacts with 66 countries. The equipment used was a Comanche receiver, a Cheyenne transmitter, and a dipole antenna.

Generally speaking, openings to the States were from 0300 to 0500 and again from 1400 to 2100 GMT. Of interest to us is the fact that when they could get through to us they could work any part of the country. Let it be emphasized that the screaming from the 6s and 7s not being able to crack the East Coast kw. curtain is pure bunk! They worked 235 sixes and 37 sevens, while only 111 twos made it along with 66 ones, 57 threes, 101 fours, 68 fives, 81 eights, 62 nines and 42 zeros.

Apparently we can't change the spots on a leopard nor by constant repetition instill into the boys good operating procedure when working the expeditions. Some of the gang will never learn that an expedition could not care less that the W QTH is Podunk, that the weather is FB, or that the boy will QSL sure. Marge said one of the great problems was fellows insisting on giving their life history while the pack stood by for a QSO on a band likely to go out any minute. Another headache was those who started calling while some W/K was giving his report to Marge. Those evils cost dozens of contacts to fellow hams.

Their QSL manager (me!) would like to mention what makes his job difficult — 10% do not know how to convert to GMT! Will they ever learn that GMT is not local time on 24-hour basis and that the date is the date in London and not in California?

In closing, a tribute is due the operators. In the entire W/K log there was not one error in calls entered. Marge and Jack are planning an operation in 1961 to some rare spot and if they are able to obtain an s.s.b. exciter and a lightweight beam they will broaden their scope of operation. QST

CANADIANS! We have large stocks of nationally advertised Ham parts. *Write for Free Bulletin.*

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MODEL 440SL—ONLY $28.50* Complete with stand, grip-to-talk switch, 7 ft. highest quality 2 conductor shielded cable. Cable connector equivalent to Amphenol MC3M plug.



MODEL 440—ONLY $15.00* Low cost, same performance characteristics as 440SL. 7 ft. single conductor (shielded), less stand, switch, connector.

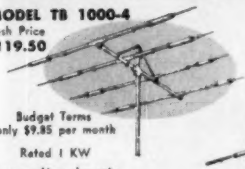
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COMPLETELY NEW . . . FROM HORNET

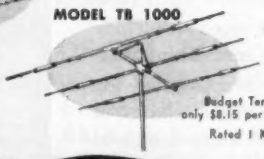
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Cash Price **$119.50**



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Four working elements on all three bands.

Superb construction and unequalled performance has gained world wide acceptance for Hornet antennas. ASK THE AMATEUR WHO OWNS ONE!

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Thousands of amateurs who have used this plan have found that there is no better way to investigate value in relation to cost, before buying.
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HORNET ANTENNAS

HEAVY DUTY MODEL TB 750



Cash Price **$69.95**
Budget Terms only $6.35 per month
Rated 750 watts

MODEL TB 500



Cash Price **$59.75**
Budget Terms only $5.40 per month
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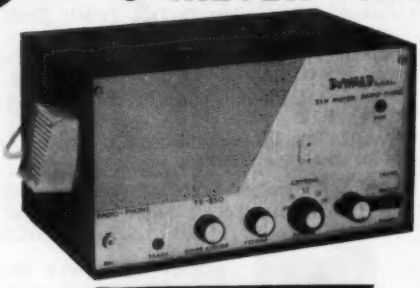
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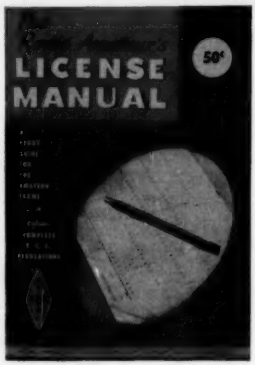
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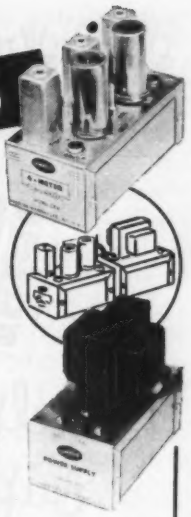
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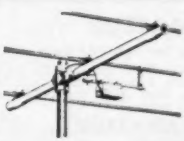
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W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.

W2, K2 — North Jersey DX Ass'n, P. O. Box 666, Hillside, N. J.

W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.

W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.

W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.

W6, K6 — San Diego DX Club, Box 16006, San Diego 16, Calif.

W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.

W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.

W9, K9 — J. F. Oberg, W9SDO, 2601 Gordon Drive, Flossmoore, Ill.

WØ, KØ — Alva A. Smith, WØDMA, 238 East Maine St., Caledonia, Minn.

VE1 — L. J. Fader, VE1FQ, P.O. Box 653, Halifax, N. S.

VE2 — George C. Goode, VE2YA, 188 Lakeview Avenue, Pointe Claire, Quebec.

VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.

VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.

VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.

VE6 — W. R. Savage, VE6EO, 833 10th St., N., Lethbridge, Alta.

VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.

VE8 — Earl W. Smith, VE8AT, P.O. Box 534, Whitehorse, Y. T.

VO1 — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newf.

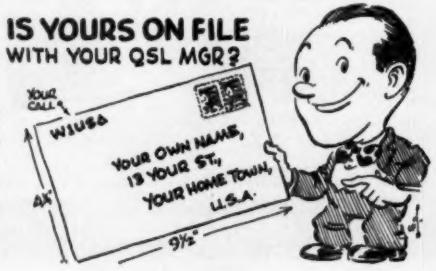
VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.

KP4 — **Joseph Gonzalez, KP4YT,** Box 1061, San Juan, P. R.

KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.

KL7 — KL7CP, 310-10th Ave., Anchorage, Alaska.

KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.



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(1) Advertising shall pertain to products and services which are related to amateur radio.
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QSLS. Attractive, colorful, Variety type styles, backgrounds. Samples 10¢. Jack Crandall, K6QAO Press, 5013 Enfield Ave., Encino, Calif.

QSLS: Cartoons, colors, samples 25¢. Chris, W9PPA, 365 Terra Cotta Ave., Crystal Lake, Ill.

DON'T Buy QSLs until you see my free samples. Bolles, 7701 Tisdale, Austin 5, Texas.

QSLS, 100 3-color, $3.00. Sample sheet, 10¢. RBL Print M.R. 12, Phillipsburg, N. J.

QSLS 300 for $3.95. Free samples. W9SKR, "George", RR #1, Box 206-A, Ingleside, Ill.

LATEST Designs, quality QSLS. Samples 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

EYECATCHING QSLS—quick! Dollar-saving sample. Dime. Rad'Oprint, Ojai, Calif.

QSLS: Samples 25¢ (refundable), W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

MAKE Your own photographic QSL cards. Complete kit of materials. Albertson, W4HUD, Box 322, High Point, N. C.

QSLS: $1.75 per 100 postpaid U.S. only. Glossy, red and green. All orders mailed within 10 days. Free sample. Hobby Print Shop, Umatilla, Fla.

QSLS. Stamp brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS you'll like. Samples 10¢. Dupli-Press, 1367 Gary St., Merritt Island, Fla.

QSLS, SWLS. Rubber Stamps, samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz.

QSLS. Samples, dime. Printer, Corwith, Iowa.

FAST Service, send stamp for QSL samples. K2 Press, Box 372, Mineola, L.I., N.Y.

QSLS. Sparkling new patterns. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLS. Large selection styles including photos. Lowest prices, fast service. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

3-D QSL cards. Really different! Over 100 color combinations. Samples free, immediate reply. 5 day service. 3-D QSL, 5 Wood End Road, Springfield, Mass.

QSLS for less with post-card size rubber stamps. Your name, address, call, stock information set permanently in rubber. Save 3¢ or more per QSL. Send for free sample to Jim, WØAYW, Will-Stamp, 1102 State, Brookfield, Missouri.

QSLS, reasonable, nice designs, samples dime, W2DJH Press, Warrensburg, N.Y.

QSLS, Giant packet samples, 10¢, Don, K5OWT, Box 332, Ada, Okla.

WANT, Need, must have: ML-203-B wind measuring equipment, as used during WW-2. Top price. Will take complete units or parts. Made by Lionel Corp. N. K. Thompson, W1LWV, 99 Water St., Millinocket, Maine.

WANTED: Back issues of QST from first issue 1915 to December 1929, and January 1960 to July 1960. K3NCU.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N. C.

KWS-1, SC-101 integrated control unit and 75A-4. A complete and superb station in top condition. Package $2000. W2ADD.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, $1.50; General, $1.75; Extra, $2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

LOWEST Prices: Latest amateur equipment. Factory fresh sealed cartons. Self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Ridge Rd., Stamford, Conn.

COMPLETE File of QST for sale: 1915-1951. Landa, R2. Clayton, Ga.

TOROIDS: Unused 88 mhy like new. Dollar each. Five, $4.00 pp. DaPaul, 101 Starview, San Francisco, Calif. After Sept. 1st our address will be at 309 So. Ashton, Millbrae, Calif.

LONG Island tube headquarters. We stock more than 1000 types of tubes. Surplus and recent production at maximum discounts. Maritime International, 199 Front St., Hempstead, L. I., N. Y. Tel. IV 5-2040.

WANTED: Cash for surplus tech manuals, one or one hundred. State condition and equipment type. W4FXQ, Box 2513, Norfolk, Va.

BUY, Sell or Trade, short-wave ham receivers, transmitters. Trigger, W9IVJ, 7361-1/2 W. North Ave., River Forest, Ill. Chicago, Phone TUxedo 9-6429. Monday-Friday, 12 N-9 PM; Sat., 9 AM-5 PM.

SOUTHERN California: Transmitters and receivers repaired, aligned, bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllog 8-0500.

HT33A Hallicrafters Kilowatt Linear; new in Oct. of 1959. Clean, excellent. $595.00. Need the cash. W2PMR, 433 Abington, Bloomfield, New Jersey.

KWS-1, first come, first served! $900 you pick it up. Virgil Shaffer, 3165 Grove Court, Cedar Rapids, Iowa.

FOR Collins in Detroit Area, it's Michigan Ham Headquarters, also a large selection of trade-ins on display. M. N. Duffy Ham & Electronics, 2040 Grand River, Detroit 26, Mich. Tel. WO 3-2270.

SELL QST 1936-1959 run, four or more, 25¢ each. WØMCX, Art A. Jablonsky, 1022 N. Rockhill Rd., Rock Hill 19, Mo.

TRANSFORMERS (3) W2EWL Special, $3.00 PP. Coils L1 thru L7, 3 xfrmrs, template for "W2EWL Special", $10.95 PP. Vitale, W2EWL, Denville, N. J.

WANTED: Panoramic adaptor or similar display device for use with 455 Kc. I.F. receiver. W8HMU, R. J. Steiger, 1953 Lakeview, Trenton, Michigan. Tel. OR 6-5924.

TOWER: Self-supporting and telescoping. All controls. Boston ratio motor (115/220V) included. Raise antenna from 20 ft. to 55 ft. W6SAI design. CQ Nov. '54. Cost over $855. Make an offer. Inquiries and Irwin Tryon, W3WFR, 1245 Earlford Drive, Pittsburgh 27, Penna.

WITH "Dip-A-Cap" and your grid dip meter, range 1.7 to 85 mc, measure capacity 3.0 to 7000 micromicrofarads easily and quickly. $3.50 each. E. M. Shook, W5IT, 227 West Woodin Blvd., Dallas 24, Texas.

SELL: 2 mfd, G. E. Capacitors 4000V DC $9.00. F. G. Dawson, Detroit 10, Mich.

RECONDITIONED! Terms! Full Guarantee! Dynamotors 200 M.A. 400 12V new $5.95; Carbon Mobile Mic.PTT cc $6.00; 24 hr. clocks 15" face $6.95; Heath Comanche $119.00, slicer $7.50; HRO-1 $169.50; HQ129X $139.50 140X $179.59 Super Pro 400X $199.50; NC-173 $129.50 100 $129.00; 240D ws $139.95 300 $229.00 57 $49.95 20-A $179.50 MM-1 $79.50; Model B slicer $39.95; Viking II $209.00; Navigator $129.95 Valiant $325.00, Adventurer $29.95; RME 4300 $149.00; DSB100 $109.00; Globe King 500A $395.00 Chief 90 $49.95 90 $49.95 90A Kit $39.95 Scout 680A $79.00; KWM-1 WPS new $695.00 75A4 $595.00 $40 $79.00 SX71 $139.00 99 $99.00; 32V II $350.00; Gonset 6 meter linear 589.95 Comm. III 2 meter $239.95; Lakeshore Band hopper $79.95; Lysco 600 $59.00; Harvey Wells TBS 50D $49.95; James C 1450 $39.95; PMR 6 $79.95 7 $99.95; Knight World Wide receiver w/s meter $69.50. Ken WØZCN Harold WØZVC Ken-Els Radio, 428 Central Ave., Fort Dodge, Iowa.

6 COIL Transistor 6 meter converter December QST $5.95. Postpaid U.S.A. Specify I.F. W5ZKT, 1441 Pleasant Dr., Dallas, Texas.

COLLINS 30K1, complete, in new condx! $600. W2TG.

WANTED: Crank-up tower. K6EY.

WANTED: HRO coils long and short wave. W8JDG, 640 Hidden Lane, Grosse Pointe Woods, Michigan.

AUCTIONFEST: Broward Amateur Radio Club's fifth annual auction and get-together, Saturday, March 11th, Armory, S.W. 4th Ave. and 24th St., Ft. Lauderdale, Fla. Doors open 8 A.M. Auctioning at 10, free lunch at noon.

AR-3 rcvr expertly wired and aligned, with cabinet and all data sheets, $26.00. New handsets, 5-wire push-button, $6.00. Brand new hermetically-sealed 500 ma. multi-voltage bias xm xfrmrs (13 lbs.) $4.00. All postage extra. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, N.Y.

HALLICRAFTERS SX88 receiver, $275.00. F.o.b. Real buy for the enlightened. W3VXE.

FOR Sale: Complete 500W, SSB station: GSB-100, HQ-170, factory-wired Viking Courier. All equipment 18 mos. old. Will demonstrate. K2GYY, Philip Margulies, 9 Pine Ct., Westfield, N. J.

WANTED: Old-time wireless receivers, xmttrs, etc. Magazines, books, give prices and description. W5WB, 702B N. Fillmore, Amarillo, Texas.

CANADIANS: Collins KWM1, in mint condx, serial #1138, never used mobile, $650; speaker console, $70; A.C. supply, $50. Cash sale only. VE1ADN.

CANADIANS: What offers for a like-new DX-20, VF-1, QF-1, Gotham V-80, Woodsworth, Royal Oak, B.C., Canada.

CANADIANS: QSLS in fluorescent colors, by silk-screen process. Free samples, Martin, 8 Kensington St., Woodstock, Ont., Canada.

TRANSFORMER Hunting? I have for sale what I believe to be the finest and most versatile transformer ever built for a conservative continuous duty AM or Sideband kilowatt. Thordarson CHT Series T15P21, Primary: 115-230 volts. Secondary: 3440-0-3440, 2980-0-2980, 2340-0-2340, 1815-0-1815, to supply 3000, 2500, 2000 or 1500 volts, DC through two section filter at 500 M.A. in continuous commercial service. Weighs 129 pounds. Cost $140. Will sell for $100 F.o.b. Chicago. R. Yeager, 1455 Wilson, Chicago 40, Ill.

COLLINS TCS transmitter, 160, 80 and 40 meters, phone and CW, best offer. Jeffrey Rockwell, K1NEF, 15 Lincoln Ave., Barrington, R. I.

560A Morrow transmitter; MBR5 receiver; RTV 630 power supply; 505B Shure mike PTT, complete with all cables and manuals. Ralph E. Moyer, W3JCQ, Rte. #2, Franklin, Penna.

SELL: Perfect Valiant, factory-wired, SX100, Hy-Gain 10, 15, 20 vert. Make an offer on any or all. WA2CTZ, Ron Marx, 1307 Ed. L. Grant Highway, Bronx 52, N.Y., N.Y.

KWM-1, AC, DC, mobile rack and all cables. Excellent condx, first $750, no trades! Michael Ferber, W1GKX, 60 Creamery Rd., Cheshire, Conn. Tel: BR 2-3086 weekends.

SELL: NC-300, spkr. 100 Kc. standard. Perfect. $225. W2EQS.

WANTED: Johnson KW Matchbox. Sell new quad antenna. Seyffert, W3CD.

MICROWAVE Equipment wanted, including Klystrons and test sets, also other test equipment including industrial type tube checkers and special-purpose tubes. Diamond, 749 West End Ave., New York 25, N.Y.

1957 DX-100, $169; RME 4300, like new condx, really hot, no drift! $139. Viking II, like CDC, $189. Lad Jelen, 3217 W. 100, Cleveland, Ohio.

DSB-100, $65; LA-1, $65; SX-71, $120; 70E-8A, $30; R-47 spkr, $8.00; QF-1, $8. All in very nice condx. K7GRB, Smithfield, Utah.

COLLINS KW-1 with 51-SB, $1695; KWS-1, high serial, $975; 75A4, $525; Thunderbolt, $45; Central 100V, $565; Drake 1-A, $170; Take S-line or KWM-2 in trade. Tom M. Nash, M.D., W5NWA, 1100 N. Canterbury Ct., Dallas 8, Texas.

CLEANING House: Challenger, professionally wired, push-to-talk, $100; HQ-110, $150; DX-20, $23; all in gud condx. K9SRR, 1408 Dial Ct., Springfield, Ill.

304-THs, three new ones, $20 each postpaid. T. P. Leary, 1212 First National Bank Bldg., Omaha, Nebr.

FREE DB-23 Preselector if you purchase NC-109, $155; DX-40, $55. Equipment like new. Unconditional money-back guarantee. K2YUG, N.Y.C. Tel. LI 4-9335.

QSTS wanted: 1915, Vol. I thru 1920, Vol. IV No. 1 inclusive; also 1954 thru 1958. Make offer. W1KVX.

SELL: Hammarlund HQ-110C with matching speaker, in exc. condx, $180. K6SIP, 15530 Loukelton St., La Puente, Calif. Tel. ED 3-5641.

SELLING Out! All gud to excellent, one owner, 100% operative. DX100, SX-101 (late), Deluxe Bug, mike, spkr, coax, all for $375; Eico test gear, exc., all deluxe models: 5" scope, electronic switch, voltage calibrator, probes, all $80; P to P VTVM, probes, $30; sweep gen., $50; transconductance tube tester, $50; RF gen, $30; AF gen., $25; signal tracer, $20; RCL bridge, $15. Decade and substitution boxes (4), all $30. Write K. Bunyard, K2HFQ/4, 45 Olive Drive, Hialeah, Fla.

TRADE 45 Colt automatic for 2-meter transceiver, in gud condx, please state make and condition. W1HRR, Taconic, Conn.

GONSET G66B, Universal pwr. supply, $150, W2JGV.

COLLINS 32V-2, $250; Central Electronics 20-A with VFO, $180, Both in excellent condition. KØAIC, Larry James, 815 N. Linn, Iowa City, Iowa.

WANTED: Small metal turning lathe, any condition American or foreign make, for cash, or will trade ham gear, H. I. Griffiths, W2OQR, 39-82 65th Pl., Woodside 77, L.I., N.Y.

JOHNSON T-R switch, used two months. Like new condx. $22.00. Sid Levinson, 393 So. 3rd St. Brooklyn 11, N.Y.

SX-99 with QF-1, $105. K10ZR (Boston), call days LOgan 7-5409.

SELL: Globe Scout 65B, clean keying, vy gud audio, gud condx, perf. for Novice with eye on general. Best offer gets it. Howard Shieber, K2UZT, 158-04 84th Rd., Jamaica 32, L.I., N.Y. Tel. JA 3-1656.

MOBILE: All-band Elmac complete. Receiver, PSR-6-12, transmitter, PE-103-A dynamotor, mike, Dow-Key antenna relay, coax, antenna mount, spring and whip with all-band MM tapped coil, $195.00. K4REU, 1135 Tamarack Trail, Chattanooga, Tenn.

SELL Apache, $230. In perf. condx. No shipping. Need cash. Inspect before you buy. W1ZGD, 233 Pratt Ave., Somerset, Mass.

FOR Sale: HQ-150, $175; DX-40 and VF-1, $65. Moseley TA-33 Jr. and AR-2, $75. Fred Gendler, 579 Rutland Rd., Brooklyn, N.Y. PR 8-7930.

SELLING Out: Transmitters, receivers, beams, 'scope, mikes, tubes, chokes and parts at fair prices. Write for list. W1HIL, 4 Sidney St., Wakefield, Mass.

SELL; Best offer, Hycon xtal filters, 2.5 Kc and .250 Kc with instrux sheet. W2BJR, 47 Meritoria Dr., East Williston, N.Y.

COLLINS KWM-1 and A.C. power supply, absolutely mint condx, $750; National NC-300 with six-meter converter, in exc. condx, $260. K2HZK, Kaminsky, 455 Schenectady Ave., Brooklyn, N.Y. Tel. PR 2-3111.

TRADE: RCA 400 16mm sound projector, Kodak Cine Special II 16mm camera with four Ektar lens, extra 100 ft. magazine, 110V synchronous motor, matte box, effects masks, Ceco Mini-pro tripod, carrying case. All perfect mechanically and optically. Cost $2,800. Trade all or part for KWM-2, S-line, HT-32A, 100V, 75A4, KWS-1, etc. Mike Shrayer, WA2BRU, 15 East 94th St., N.Y.C., Tel. LEhigh 4-1400.

SALE: Receiver BC-348R with AC supply, in gud condx, FB xtal filter operation with this one, $65.00 or your best offer: Sonar VFX 680 VFO with NBFM, needs power transformer, $20.00; TS-239A oscilloscope best offer. Pay shipment. J. D. Bryant, 106 W. Lancaster, Malvern, Penna.

COLLINS 75S1 with 500 cycle filter, 32S1 xmttr, 516F-2, 10-D mike and stand, $900. Wm. Seibly, K6ISR, 217 Wilcox, Montebello, Calif. After February 6th!

DX-100 and Temco 750 watt transmitter for sale or trade for teletype equipment. Jack Cook, K0AQO, Freeman, Missouri.

SELL: Viking with Heathkit VFO, $139.00; complete 2 meter station, 522 receiver and transmitter in neat cases with power supplies, 10 el. Hy-Gain and rotor, $80; B&W balun, $6.00; 810 tubes, $6.00; 500 w. modulator, xfrmr, $24.00. All gud. K9LQR, Hillsboro, Ind.

HALLICRAFTERS SX-99, with S-meter, xtal filter, in mint condx, factory manual also, $95.00. J. C. Hall, 734 N. Stevenson, Flint, Mich.

WANTED: Collins 32S-1 transmitter with 516F-2 power supply. Serials over 1000. State condx and price for shipment to K4JRW, 217 Rodman Rd., Norfolk 3, Va.

BC-639 manuals. Not reprints, $5.50 postpaid. R. J. Sukey, 24-H Prospecthill Lane, Waltham 54, Mass.

CLEANING House! Ampex Model 601 tape recorder, used very little, cost $595. Will sell for $450; Ekotape recorder, used, works OK, $35; BC433 receiver, $20; PE103 dynamotors, $10 up; Carter Dynamotor 12DC in 750V 300 Ma. outp., $15; LM7 frequency meter with calibrating book matched to xtal, home-brew pwr. supply, $50.00; 833A tube, new, $20; 500V condenser 15 microfarad, new, $20; swinging choke 1 amp, $10.00; Jennings vacuum variable condenser 20 to 675 micromicrofarads, $30.00; SX-100 receiver, exc., $150. Will ship. You pay charges. Sig Ades, W3WQN, 1924 Tulip St., N.W. Washington 1, D.C.

MILLEN 90800 50W xmtr, pwr. supply, table rack, $17; 90881 ½ KW amp., coils, pwr. supply, rack, $95; Heath AG-7 audio gen., $20; AT-1 xmtr. modified, $12.00. All for $125. In exc. condx. David Popkin, WA2CCF, Englewood, N.J.

COLLINS 75A4 Serial No. 5538, immaculate, with 800 cycle, 2.1 Kc, 3.1 Kc and 6 Kc filters. A cream puff with very little use. Price $675. Also Hallicrafters HT-32, perf. condx, with complete set of brand new spare tubes, price $475. Will sell both units for $1,050. Cash. Bob Anderson, W1LBA, 428 Central Ave., Milton, Mass. Tel. OXford 8-9337.

CIRE Course with Pickett vector hyperbolic slide rule and leather case, $30; National Radio & TV course with kits, $50; National Electrical Code course with Pickett #1010-T and leather case, $10; License Manual by Rider and Pickett log, log with leather case, $10; Supreme multimeter #543, $10; Hydrolic wiring jig, $10; tube caddy and 50 new tubes, $20; Teletest capacitester CT355, $15; 5 panel meters, $3; Jackson tube tester with 49-S accessory unit and 50 new tubes, $50; B&K tube checker with filament accessory unit and 50 new tubes, $60; Knight 5-transistor radio, $10. Witmer, 201 Byron, Colonial Pk., Harrisburg, Penna.

COLLINS: KWM-1, AC supply, $595; 51J2, $495; 51J3, $675; 75A2, $275; 75S2, $525; R-390A, HT32A, $475; Valiant, $299; Ranger $210; R-274, 54-54 Mc, $295; BC-1031C Panadaptor, $125; BC-610-1, $295; HRO-60, $325; HRO-50T1, $225; Northern Radio VFO, $125. Want teletype equipment for cash, or trade for new amateur equipment. Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. RIchmond 2-0048.

COLLINS 75A3, $365; Ranger, $175, both in exc. condx. Fred Norton, 1450 Winchester, Muskegon, Mich.

FOR Sale: HT-32, 75A4 serial #4592, Thunderbolt, Gonset Triband, tower, rotor, Jones MicroMatch, all perfect, $1500 complete, plus. Best offer package or individuals. K2HWP, 100 No. Davis St., East Syracuse, N.Y.

SELLING HT-37 and SX-101A, like new condx. Antennas gone with the wind. Dr. K. Sayther, WØBQ/5, 1304 Christopher Ct., Metairie, La.

SPEED Your DXCC, WAS. Send Reply-Paid QSLS. Usable samples, dime. Hart, 467 Park, Birmingham, Mich.

SELL: HQ-100 with clock, $125.00 or your best offer. Like new condx; will split shipping cost. Craig Wilson, 109 South Albert, Mt. Prospect, Ill.

ZENITH Transoceanic for sale. 1 year old Leather case and battery. New, $159. Best offer over $85. No scratches. George Gibson, 409 Cattell St., Easton, Penna.

FOR Sale: Hammarlund HC-10 converter, A-1 condx. Complete, manual, $95.00. A. R. Bentley, W1SU, 8 North Beach St., Nantucket, Mass.

SELL; Complete station as am college bound: HQ-110C, Viking II with VFO, Johnson T-R switch and low-pass filter, all in mint condition, $395 or will sell separately. W6DOP, 212 Linda Dr., Santa Maria, Calif.

COLLINS KWM-1 in excellent condition with noise blanker, $595; A.C. pwr. supp., 12V DC pwr. supply, mobile mounting tray with cable and connectors, $275. W8UEJ, 4042 Loomis Dr., Muskegon, Michigan.

1½ KW modulation transformer. Multi-Match, new, never used, make offer; 4-El, 20 ft. boom Hy-Lite 10 Mtr. beam, $15; 30 ft. mast and AR-22 rotor, $10; K6EOS, 522 N. California St., Burbank, Calif. Tel. TH 6-4966.

SELL FB Eico 720 xmttr. Factory checked! $60.00. (No haggling). F.o.b. Write KN1OMJ.

SELLING Out: Brand new HT-37, $345; SX-101, Mark II $240; Globe Scout 680A F/W, $65; PMR-7 and PSR-612 P/S $110; S-40B, $80; NC-98, $95. K5JZV, 5847 South Pittsburg, Tulsa, Oklahoma

TRADE: Award-winning stamps, many volumes, leather bound. Want: Receivers, transmitters, 144 Mc station. What have you? Also need U.S., Nicaragua, Costa Rica stamps. Details. W4GEI, Box 991, Daytona Beach, Fla.

TV Camera, clean, operating condx, single compact commercial unit, 2-in. built-in monitor, lens, Vidicon, $365. W8DMR, 2738 Floribunda, Columbus, Ohio.

SALE: Mosley V-4-6 vertical Antenna, exc. condition, $25.00; VM-714 stereo tape recorder with microphone, perf. condx, $100; radio-control boat, recvr, transmitter, Servo, batteries, Pittman motor, complete, best offer over $50. Please write WA2JSJ, Paul Perkins, 325 Victory Blvd., New Rochelle, N.Y.

FOR Sale: Viking I xmttr, $100; HT-18 VFO, $30; Gonset G66B recvr and G77A xmtr, both w/3-way pwr. supp., Shure P/T mike, mobile mounting brackets, Hellwhip Triband mobile ant. and all cables; FB fixed or mobile, all for $385. F.o.b. Chicago. Jl. K9PNG, 309 So. Oak St., Palatine, Ill.

TRADE. No cash! 16 mm Kodak Kodascope Pageant, sound or silent movies projector, like new, with 6.000 ft. commercial sound film, some color, for: factory-wired, in first-class condx, Viking Valiant or Collins 32V series. Will consider Ranger and something to sweeten the deal. J. Zagar, 9504 Linden Blvd., Ozone Park 17, N.Y.

GETTING Married: Sell excellent condx, DX-100, NC-98, Telrex beam, tower, accessories. K2OOF, 53 Campbell, Princeton, N.J.

FOR Sale: SX-99, in gud condx, with fones, Q-mult, spkr, all $135. Hayton, 3253 N. Damen, Chicago, Ill.

HT-32 Perfect, best offer over $450; tabletop custom built 3-tube 811-A GG linear, fully bandswitching and metered, $50; 1300 volt 500 mil pwr. supp., best material and workmanship, $50. J. H. White, Box 521, Greeley, Colo.

COLLINS 75S1, 2500 series, like brand-new, with 312B-3 spkr, $415; CE20A, 8000 Series E, like new, in spotless cabinet, with QT-1 and BC458 80-10 VFO as per QST Feb. 1957, $190. WA2GWE, N. E. Woodward, 93 Plass Rd., RD #3, Poughkeepsie, N.Y. Tel: GRover 1-4128.

SENECA. Unused. Globe Chief 90A. Joined USAF. Best offers. Want Heath Cheyenne and Comanche A2C. R. Schmidt, Box #5, APO 338, New York, N.Y.

COLLINS KWS-1, in perf. condx, brand new, final, tubes $1200; 75A-4 500 cycle and 3.1 Mc. mech. filter, $550; matching control cabinet with spkr, rotor turn indicator, directional watt meter, antenna selector switch, rotor control switch. Commercial appearance. George L. McInnis, 204 Parkview Dr., College Park, Ga.

PERFECT HQ-110, clock, speaker, $190; gud Hallicrafters S-85, $75; Heath "Tener", perfect, $40. Trades considered. K4WWL, 312 Bryant, Dalton, Ga.

FOR Sale: SX-101A, $295, like new, Lettine 240, $50, with mike, coils, crystals. Dan Pizzica, W3NCY, 23 Brilliant Ave., Aspinwall, Pgh 15, Penna.

COLLINS S-Line station. Another "estate special". 75S-1 w/BFO and xtal, 32S-1 w/516F-2 pwr. supply, 312B-3 spkr, 30S-1 amplifier, $2095 all. Showroom condx. Operationally perfect. On the air. Clock timer on amplifier certifies low operational usage of equipment since purchase. Frank, WA2FMC, Rte. 111, Smithtown, N.Y. Tel. ANdrew 5-6137 evenings.

COLLINS KWS-1, in exc. condx, $1000 F.o.b. Cedar Rapids. Robert Olson, WØMTR, 2134 Country Club Parkway, Cedar Rapids, Iowa. Telephone EMpire 2-0863.

VHF-6N2 Viking Thunderbolt, $500; SR-34 Hallicrafters, $380. K4RTG, Penhook, Va.

SELL-Swap: Complete shallow water diving gear with compressor, etc. Roberts and Pentron tape recorders. Geiger and scintillation counters. TBS-50D with speech amp., and 110 v power supply, $50; pair 4-250A, new. Motorola FMTR41V complete, $70; FMTR80D, $90; other two-way gear. Antique tubes, old QSTs and QSL meters, lots more. Have to sell out. Need 108-132 Mc am monitor, other aircraft radio gear, slide projector, etc. Send for big free list. D. Hale, W9RBX, 635 S. 21st St. Ave., Maywood, Ill.

LIGHTNING Bug, used few hours, $12.00; Heath Q multiplier, $6.00; B & W 40BVL and jack bar, $3.25. QSTs 1941 through 1955, plus 30 older issues, $16.50. Whitney Gardner, 4627 Briarcliff, Baltimore 29, Md.

CRYSTALS. 80-2 meters, 25¢ each. Guaranteed. Send for frequency list. Power transformer, Stancor 1200V CT as 200 Ma, plus filament windings, $4.75 each, plus postage. W6IMC, 210 Alden Rd., Hayward, Calif.

WANTED: Gonset Super Six or Tribander. Lennart Larsson, Vulcanusgatan 8, Stockholm VA, Sweden.

FOR Sale: Collins 75A2 recvr with Drake Q-multiplier and matching spkr, $250.00. 600 watt cw, 350 watt phone, all-band transmitter, $150. Roger Goodland, W9JHB, 5306 Sunnybrook, Ft. Wayne, Ind.

TRADE All or part of outboard racing rig for Collins mobile unit KWM-1 or KWM-2, with A.C. and/or 12V mobile supply. Racing rig in mint condition and ready to race, have over $3000 in the rig. Ted Jones Class F Hydro, 60 cubic inch Texas F Evenrude Power head on Mercury Q.S. Lower unit, spare power head, both fully modified, 100 cubic in. McCoullough drone powerhead, specially built trailer. Other necessary parts for racing. Dr. F. W. Estill. Box 1022. Freeport, Texas. Tel. BElmont 3-5911.

FOR Sale: Heath DX-40 transmitter with key, extra xtals, in excint condx: $45.00. Irving Friedman, 301 W. Blackwell St., Dover, N.J. Tel. FO 6-4666.

SELLING Out station and parts: VFO, DX35, 450 watt amplifier, 100 watt modulator, bear on 40 or 20 nightly, NC98, QF-1, 20 and 15 meter converters, 6 and 10 meter mobile transmitter with 6 volt vibrator supply, PE-103 plus collection relays, meters, capacitors, tubes, etc. Lot only. Will not ship. $285 or best offer. Ken Archibold, W4MWG, 116 Stribling Ave., Charlottesville, Va.

RME 4300 (with matching speaker), $140; NC-98 (no spkr), $95; postage paid within 2300 miles. K5EQP. 5530 East Tecumsch. Tulsa, Okla.

MUST Sell: Apache, $185; E-Z Way crankup tower, 41 ft. RBD-40P, with bldg. brkts, $135; TA-33, $60; Micro Match Reflectometer 711N, $10; Johnson lo pass filter 250-20, $8; Johnson Bug 114-500, $8; Collins dynamic mike, SM-1, new, $12; Simpson 260 multimeter, $25; 2-813s, new, $15; 2-417As, new, $10; 2-416Bs, new, $30. You pay shipping. 4¢ stamp for more info. Write N. Samuelson, 726 Forbes Ave., Chittenango, N.Y.

FOR Sale: DX100 perfect condx, $165; NC-125 rcvr, $95; HRO-M general coverage and bandspread, 4 coils, $65. Wanted: Johnson KW Matchbox State price and condx. W2GTK, Edward Cilliers, 174 Central Ave., Bogota, N.J.

20-A, QT-1 Deluxe VFO 160-15M, all factory wired, $175. Heath SWR Bridge, $10; Heath balun coils, $5.00. J. Smith, 209 W. 8th St., Mt. Vernon, Indiana

REGENCY Transistorized converter, $45. W8HQY, 1867 Berkshire Rd., Columbus 21, Ohio.

WANTED: Collins 75A-4, state serial number, filters, condx. W8KMD. 635 Woodbury Ave., Columbus 23, Ohio.

SALE: Station, HQ-129X with Millen R9r, recently serviced, and 120-watt phone/C.W. 10 meter xmtr, all $180. Local pick-up. W2HZQ, 2132 E. 13th, Brooklyn, N.Y. Tel. DE 9-8175.

GLOBE-KING 500A-500 watt, AM-CW all-band xmtr with VFO, $150. W9QXR, 1424 Noyes, Evanston, Ill.

HALLICRAFTERS S-85 receiver for sale, in exc. condx. $80 or the best offer. John Rybicki, 2238 Spruce Rd., Homewood, Ill.

WANTED: APR4 or RDO, and RBL receivers. Also APR4 tuning units, TN16, TN17, TN18 and TN19. Will purchase any unit separately. W. O. Wesslund, WØDNW, Rte. 2, North Platte, Neb.

FOR Sale: New Heathkit Comanche receiver. Wired and tested. $115. WØURO. 1258 Van Buren, St. Paul 4, Minn.

APACHE TX-1 transmitter, professionally built, $249; Hammarlund HQ-110C receiver, $190; both hardly used and nearly new. K1KRO, Glastonbury, Conn. Tel. ME 3-9243.

WANTED: 4-250A, new or used. W2BMK.

FOR Sale: SX-101A and factory-wired Johnson 6N2 converter as a unit, and HQ-170C. Swap either unit and cash for SP-600JX. Make me an offer! Write: S. Bezer, % Ray T. Brady Motor Co., Markley and Oak Sts., Norristown, Penna. or call: MA 3-7981 after 7 PM.

SELL: Dow-Key DKC-TRM antenna relay. Never used, $7.00; QSTs 1935-1955 (all or part of run), reasonable; several Vibropacks and other power supplies; 814 buffer amplifier and 100TH PP final; HDVL coils, new 810, 814, 4E27A, VT127A tubes, modulation monitor. Prices right. Write for list. W3BS, 1012 Wilde Ave., Drexel Hill, Penna.

SELLING Out: DX-35, Meissner Signal Shifter, KW plate xfrmr, Variac, 300 W. modulator, Gonset converter, thousands of parts. Send for list. W3SHP, Snydertown, Penna.

BEGINNERS: Code memorized in one hour. New method. Used in armed services, ham radio, scouting. "Ketchum's Hour Code Course" $1.00 postpaid. Money-back guarantee. O. H. Ketchum, 10125 Flora Vista, Bellflower, Calif.

SELL: HQ-110-C, perfect, $175. W2PWF, 78-42 264th St., Floral Park, N.Y. Tel. FI 3-9382.

BOOMERANGS. Northern Australian aboriginal mission planning amateur radio operation has given me quantity of boomerangs for swapping. Should you have gear surplus your requirements write: R. B. Jones, 131 Queenstreet, Melbourne, Australia.

COLLINS 75S-1 rcvr. Purchased new 9-60. Best offer. K9CPW. 5037 Olympia, Chicago 31, Ill.

FOR Sale: One 4-1000A grounded-grid linear amplifier with tube. $150. K4PIJ, 1126 Elizabeth St., Eau Gallie, Fla.

SELL: Communicator III, 6M 12V. KØVNC, 3319 McKinley, Omaha, Nebr.

A-1 RECONDITIONED equipment. On approval. Trades. Terms. Hallicrafters S40-B $69.00, SX-99 $109.00, SX-100 $199.00, HT-37, S85, SX-110, SX-111, SX-101A, HT-32; Collins 75A-1, 75A-2, 75A-3, 75A-4, KWM-1, 32S-1, 75S-1, KWS-1; Central 20A $159.00; Elmac PMR-6 $69.00, AF-67 $109.00; Gonset G-66B, G-77A, G-50, GSB-100, GSB-101; Hammarlund HQ-100 $129.00, HQ-110 $179.00, HQ-129X, HQ-140X, HQ-140XA, HQ-150, HQ-160, HQ-170, HQ-180; Johnson Adventurer $29.00, 6N2 $99.00, Navigator $99.00, Viking II $179.00, Valiant; National Nc-98 $89.00, HRO-50T $199.00, NC-300, HRO-60, NC-183D, NC-303; Heath, Globe, RME other items. List Free. Henry Radio, Butler, Mo.

SELLING Out: Spare 4-1000As, nearly new, guaranteed, $20.00 each. W8SQU, Cleveland 31, Ohio

WANTED: Xtal calibrator XCU300 for NC-300 rcvr. WV2PLK, Ernest Mintel, 303 East Gibson St., Canandaigua, N.Y.

SELL: DX-100, $140, 2 new 6293s in final; HQ-145C, $200, both in exc. condx. Extras thrown in. 15 meter beam, 100 ft. of coax and mike. WA2ESY, Jerry Rubin, 299 E. 94th St., B'klyn, N.Y. Tel. HY 5-4482.

SELL: Transcon 6, $65. James 6-12V pwr. pack, $25; DX-35 wired for 6m. WA2AIC. Millbrook School, Millbrook, N.Y.

SOUPED Viking II. 2-866As, blower, SSB wired, PTO, $225; Collins VFO, ganged exciter, 160-10 meters, $55. Chester Benson, W9IFB, 732 South 14th St., Richmond, Ind.

ELMAC Mobile, AF67, PMR-7, M1470 power supply; Dow 12v relay, mounting racks for AF67 and PMR-7, connecting cables included. All are in gud shape. College, $310. K5JLF, Troy Morrow, Station A.C.C., Box 834, Abilene, Texas.

GONSET Twins: G-66 with 3-way power supply; G-77 with all cables and Shure 505B mike. In excellent condx. $350. Doc Piper, W1WZ, Concord, Mass.

SELL: Complete 500 watt SSB station, Collins 75-A2 rcvr w/Universal product detector, $280; Central Electronics 20-A exciter with BC-458 VFO, $200; 500 watt linear, Eldico SSB-500 with 2 spare 4X250-B tubes, $265.00; Hy-Gain TH-3 and Rohn tower, six mos. old. Write. Tubes: 304TL, $30.00; 4-250-A, $20; 4-65-A, $12; 4X150-A, $9.00; 4X250-B, $25. Also gun collection and cameras and lens. Deal? Patterson, 2660 Galewood St., Dayton 20, Ohio.

FOR Sale: Going mobile, SX-110 rcvr, in exc. condx, in orig. carton and with manual, $105; R-48 spkr, $10.00; DX-40 and VF-1 VFO, in perf. condx, w/manuals, $75; Collins TCS-12 xmtr, $60. Joel Herbsman, WA2GZD, 1510 Unionport Rd., N.Y. 62, N.Y. TA 2-7215.

SELL: HQ-170, $290; Globe 6N2, $100; Viking Ranger PTT, $180; NC-300-6-2 1¼ meter converters, $340; Gonset III, $215.00; Heath grid dip meter, $18.00; D-104 mike, $17.00. All are in mint condx. Prefer a pick-up deal rather than shpg. Peter Miller, W1AMJ. Tel. PL 9-2992. Chandler Drive, Prospect, Conn.

SELL: Collins mech. filters, type F500B 60, and F500 B 31. Best offer. WV1YZL.

CRYSTALS Airmailed: SSB, MARS, Novice, Net, Etc.—Custom finished FT-243 .01% any kilocycle 3500 to 8600 $1.49 (10 or more FT-243 99¢), any quantity novice 99¢, 1700 to 20.000 $1.95, 20.001 to 30.000 $2.25. Add 50¢ each for .005%. Add 60¢ each for HC-6/u hermetics. QST Packaged Crystals: "SSB Package" June 1958 and SSB Handbook; "Phasing" November 1959; "IMP" May 1960; "DCS-500" February 1960:—Packaged sets (5 FT-243) $9.95, hermetics $13.95. Filter: "Package" seven matched June 1958 $7.45; October 1960 $11.80. Crystals for all projects, write. Airmailing 9¢ per crystal, regular 5¢. Crystals since 1933. C-W Crystals, Box 2065Q, El Monte, Calif.

TRADE Or sell: four transistor Sonotone "1200" hearing-aid with air conduction receiver. In exc. condx. Swap for commercial equipment, VHF preferred. Jay Cady, WA2ILH, Mayville, N.Y.

EXCELLENT DX-35 for sale, $40. K8JWO, 451 Lynn, Berea, Ohio. Tel. BE 4-4521.

FOR Sale: Globe Champion 300-A, $325; Communicator III, 6M, w/mike and halo antenna, $210; HRO-5RA receiver complete, $125, all in excellent condx. Will deliver within 150 miles. W3LSS, 58 W. Main St., North East, Penna.

COMMUNICATOR III, 6 meters. Can't tell from new. $185.00. William Richrath. 1410 Portsmouth. Westchester, Ill.

WANTED: B-W filament choke. FC-30 also filament transformer 5.2V 30A. K2EGI, 5 Stratford Place, Babylon, L.I., N.Y.

KITS Constructed: Competent, precision work. Licensed, capable and experienced technician. Twenty-five percent plus postage. Inquire to: Precision Electronic Systems, John Noe, K2OFD. 226 Naples Terrace, NYC 63.

SELL: HQ-110, spkr, xtal calibrator, best condx, $170. W2KWB, 30 Drohan St., Huntington, N.Y.

SELL: Two-meter W2AZL converter, $40.00. Ackerman, W2HVL, 57-47 Marathon Pkwy, Little Neck, L.I., N.Y.

KILOWATT, Johnson Viking, $850.00; Globe LA-1, $80.00; WRL VFO #755, $35.00; Viking Mobile, $60.00; Johnson mobile pwr. supply w/dynamotor, $20.00; PE-103 dynamotor, $10 (plus shipping). W5FJR, 515 West Main, Houma, La.

COLLEGE: Must sacrifice new HT-37, used only 25 hours, $350.00. F.o.b. K5WXK, Smith, 660 Magnolia Woods Drive, Baton Rouge, La.

DX-40, VF-1, both in perf. condx, plus 5 Novice xtals, $70.00. K3JMM, John Falcone, 207 Mattison, Ambler, Penna.

COMPLETE All-band mobile station. Includes Viking mobile transmitter with VFO, Gonset Super Six converter, remote-controlled antenna tuner, Johnson loading coil, whip antenna, Shure mike, 6V alternator system, dynamotor, cables, T.N.S., manuals, etc. $200.00. Will not ship, sry. Local deal preferred. W2LFL. Phone FReeport 8-2139, Merrick, L.I., N.Y. 1757 Seaman Drive.

FOR Sale: Heath GD1A grid dip meter, $17.00; 90 watt compact xmttr, $35.00; 20.000 ohm per volt VOM, $18.00; 15 watt 160 meter mobile transmitter, $20.00; 100 watt modulator and pwr. supply, $20. All postpaid. Write for details. C. K. Loomis, Jr., 10945 Whitehill, Detroit 24, Mich.

SELL: Factory-wired 20-A, 458 VFO, QT-1, $180; SX-100, $180; Johnson 250-23 Matchbox, $35. All excellent. Larry Coffman, W6WIAØ. 2000 Tenn. St., Lawrence, Kansas. VI 2-1411.

VY Clean 6-meter Communicator III for only $200 F.o.b. 3130 Daisy, El Paso, Texas. Pete Williams, K5MBZ.

DX-100B, gud condx, $175, home brew 813 amplifier, $20. McGee 58 Campus Dr., No. Buffalo 26, N.Y.

SELL: DX-100B (also MK-1, SB-10 new in kit form). Matchbox. Want: perfect KWS-1 and 500 or 800 cycle and 6 Kc. filters for 75A-4. K2SNJ, Glenn, 31 Claremont Rd., Scarsdale, N.Y.

SELL: Hallicrafters HT-6 transmitter, $50.00. Yagel, 366 Brooklyn St., Sharon, Penna.

DX100B, $165 personally delivered within 100 miles of Scranton, Penna. Sry, cannot ship. Jack Ayres, 325 Washington Ave., Jermyn, Penna.

SALE: P4125As in KW xmttr, built-in oscilloscope, ant. tuner, $300. Complete mobile rig, $60.00. Write for information. K5SSZ, Orchard Drive, Columbia, Miss.

FOR Sale: Elmac AF67, mike, PRM7 revr, M1470, 12V/115V supply, like new, $275. Glenn Winters, K5SYM, 1050 S. Church, Mountain Home, Ark.

HQ170C with Damp-Chaser, $285; HT-37, $375. Both for $645. Ship in original cartons. F.o.b. NYC. Siegel, WA2FSD, 11 Burbury Lane, Great Neck, L.I., N.Y.

MOHAWK, built by electronics technician, $250. Deliver within 50 miles. John P. Barker, 1127 Commonwealth Ave., Boston 34, Mass.

TRANSMITTING Micas, power xfrms, 803 tubes, all half-price; also RU-18 rcvr, complete. Stamp brings details. K1BSL, Al Blackington, 530 Beacon, Boston, Mass.

KWM1, AC supply and mobile mount, $675.00. Perf. condx. H. T. Howard, 3719 Circle, Pal Alto, Calif.

SELL: 75A4, perfect condition, S.N. 2533, $550. W6WZD, 98 Fairview Ave., Atherton, Calif.

FOR Sale: HQ-145C, w/cal, $225 instr. bk; 20A-W/458 VFO, $175; 837 final w/ps-O-1400-Variac, $50. No cables. Package deal: $425.00, and cash & carry. W2VFW, Jake, Millburn, N.J.

RECEIVER: NC-173 for sale. Gud condx. Best offer takes it. K2DRD, 2184 Larch St., Wantagh, N. Y. Tel. SUnset 1-2799.

FOR Sale: NC-183D, spkr, manual, $225; DX-100, manual, $125.00. Cash & carry or money order and you pay packing and shipping. J. A. Worrall, WA2KPV, Walson Army Hospital, Ft. Dix, N.J.

WANTED: Heathkit DX-35 manual. Theo. Spector, WV2PNI, 2507 Jay Place, Union, N.J.

WANTED: Early QSTs. Have seven hundred duplicates to trade, including CQ. Erv Rasmussen, Box 612, Redwood City, Calif.

ELDICO Model TRI TV 300 watt, all band switching transmitter. In fine condx, with Meissner signal shifter, $150. Need or swap for Lampkin meters or 75A or 75A2. Send for list of other equipment and parts. Lonnie M. Utt, W4FNH, Cana, Va.

WIRED & tested Heath and Knight-kits, DX-100-B, $239.95; VHF-1 Seneca, $210.50; Apache, $209.95, and others. Write C-V Electronics, 3138 Bougainville St., Sarasota, Fla.

HQ-129X w/spkr, $125. Set PW KW adjustable link coils, $10, pole pig, $20; Hickok 760 pattern generator, $175; RCA KW modulation transformer SCR522 with RA62. BC654. List for stamp. Williams, W7MUG, 1322 Court Place, Rawlins, Wyoming.

SX-100, factory-wired Valiant, mike, Dow-Key relay, Mosley TD3 plus 40 and 10 meter antennas with 100 ft. RG11-U coax. All in like-new condx. Station hardly used. Will deliver in Nassau County, L.I. $625.00. Write WA2AZF, 1 Barnes Ave., Baldwin, N.Y.

SELL: HQ-110C, used about 40 hours in perf. condx, $175; Viking Navigator, $90; Eldico low-pass filter, $3.00. W4ICK/2, Quarters 267, West Point, N.Y.

SELLING OUT: KWS-1, perfect, $975; 6V mobile P.S., 425V-375 Ma., $20; Bell 3030 stereo preamp and amps, $100; Robert stereo 4-track record and playback with preamps and amps for speakers, $375; Concertone (American Electronics) Custom 33 series 7½ and 15IPS, stereo recorder, preamps, 10" reels, 4 heads and room for 5th, carrying cases, $690. W3VDE 1219 Yardley Rd., Morrisville, Penna.

SELL: Collins 32S1, 75S1, AC supply, all in like-new condx, in orig. cartons, used only few hours: $900. Lou Fischman, 7 E. 42nd St., New York City.

TENER Transceiver. Looks and works perfect. Xtal. Checked and calibrated at Health $40.00. Matching mobile supply, $9.00. KØLRU.

HIGHLY Effective home-study review for FCC commercial phone exams. Free literature. Wallace Cook (Qs), Box 10634, Jackson 9, Miss.

"HORSE-TRADER" Ed Moory refuses to be undersold. HT-37 Demonstrator, $339.00; New 200V's, $695; KWM-2 Demonstrator, $895; Drake 2-A Demonstrator, $219; Drake 1-A, perf., $179; 75A-4, perf., $569; Complete S-Line Demonstrator, late serial No., $1050; LA-400-C, Linear, new, (kit) $149; 600-L, perf., $269; Collins 30S-1 Linear brand new, slight freight damage, $1269; SX-111, Demonstrator, $219. Terms: Cash. No trades! Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

LEICA Photo equipment wantd. Have 183D plus cash. Jack Watt, W8HYQ, Ontonagon, Mich.

CASH For clean 75A4. Lost accessories. W7ADS.

SALE: SX-101A, perf. condx, like new, $285.00. WV20VI, 61 Hemlock Lane, Massapequa Park, L.I., N.Y. Tel. LI 1-9199

HALLICRAFTERS S-85 receiver, $80. WØFXP, 704 Irvine, Bemidji, Minn.

VALIANT Transmitter, excellent condx: $275. VF-1, $10, plus shipping. Michael Richter, K2HMR, 1 Oxford Blvd., Great Neck, L.I., N.Y. or 119 Charles St., Boston, Mass.

FOR Sale: 2-BC-221s, one modulated, one not modulated. Both with original calibration books: $60.00 and $50.00 respectively. 4-400A tubes, new and used, $20 and $15.00. 1-3X2500A tube, new, $100. W4PNF, 106 Quincy St., Fayetteville, N.C.

SELL: Viking 6N2, $80; 50-144-220 MC. converters, $12 each; 2 meter portable xmttr, $10. Will ship. Howard Fruchter, WA2DCM, 589 Barnard Ave., Woodmere, N.Y.

SELL: Eldico 1000F linear, perfect. See Jan. QST p. 172 for description. $500 or best offer. W2KOY, 1740 Front St., East Meadow, N.Y.

JOHNSON 6N2 converter, factory fresh, brand new, never used! Lists at $89.95. Will sell for $75.00 or trade for Heath SB-10. Frazier, 229 Seaview Ave., Daytona Beach, Fla.

SALE: Heathkit DX-20. Like new. Best offer. KN3MFV, Blairsville, Penna. RD #1, Box 326d.

FOR Sale: Heathkit DX-100, $169, expertly built. John Bailey, 119 W. Wildwood, Ft. Wayne, Ind.

"DON'T Be greedy—help the needy". Our ARC is to train Capuchin seminarians in ham radio for use at home and in the missions. Idea is new, superiors skeptical, money short. Can you donate some equipment to help us? All inquiries answered. Adr: Fr. Rian, WA2KTE, Mary Immaculate Friary, Garrison, N.Y.

NATIONAL FB7XA receiver with power supply and 9 sets coils, $25.00; ATC-1, $50; Silver 909 sweep signal gen., $15; Want: HT-37. State price and condition. All letters will be answered. WITF, Elmer Turner, 2 Virginia Circle, Reading, Mass.

POWER Supply, 110V at 300 Ma. Other equipment. Send for list. KØPTV.

FOR Sale: Hallicrafters SX-101 Mk III and matching spkr, $295; Collins 32S1 and 516F2, $590. K9BJM, Hoopeston, Ill.

COLLINS 32V-3 transmitter, in exc. condx: $350.00. Kenneth Engstrom, W5CUM, 833 Oak Forest Dr., Dallas, Texas.

WANTED: Model 15 or 19 teletype table Trade FR-70/U secondary frequency standard (accuracy 1 or 2 parts in ten million) for compiete 19 set or NC-183D or Model 28KSR. Want 0-5/FR (Press Wireless FS-12A) exciter, TM 11-2203, 11-2205, 11-2216. Sell FT-338-A mount for BC728, $1.35 postpaid. W4NZY, 119 North Birchwood Ave., Louisville 6, Ky.

SELL Home-built 10-20 mtr. xmtr, built for mobile, 807 final, PP 6V6 mod. Complete with tubes, xtal, coils for 10 mtrs., dynamotor, $45. Thordarson plate xfrmr 3000-2500 VAC CT., 300 Ma., $15; BC459 with built-in speech, converted for NBFM on 75 mtrs. $15. Lynn, W9PYA, 3802 Jay Lane, South, Rolling Meadows, Ill.

COMPLETE TCS-12 transmitter and receiver, in excellent condx: $100. Includes all A.C. power supplies. James Morris, WA6JAB, 520 West Locust, Lompoc, Calif.

HEATH Apache, in fine condx: $199. Excellent HQ-170C, $299. Larry Lawrence, 118 Santa Isabel, Costa Mesa, Calif. Tel. LI 8-1754.

COLLINS KW-1 with 51-SB, $1695; KWS-1, high serial, $895; 75A4, $515; Thunderbolt, $395; Central 100V, $495; Drake 1-A, $179; Gonset G-76 with DC supply, $359. Tom M. Nash, M.D., W5NWA, 1100 N. Canterbury Ct., Dallas 8, Texas.

LIKE New: NC-125, $100; Heath DX-35, $35; VF-1, $15; Knight xtal calibrator, $6.00. All manuals. You pay shipping. W8SQS, 7864 English, Brecksville, Ohio.

HALLICRAFTERS HT-37, seven months old, $385 or best offer. W1GFH/5, Zuromski, 6580 ABG, Box 334, Holloman AFB, New Mexico.

SALE: Two 4-1000T tubes, $25.00 each. Vicky Lucas, 307 North Main St., Houston, Penna.

BRAND New Hammarlund HX-500 transmitter in factory sealed carton with warranty. W9DOO, Madison, Wisconsin.

KWM-1 D.C. pwr. supply, mount and cables, in mint condx, $250.00. W2KHV, 80-30 256th St., Floral Park, L. I., Fieldstone 7-4701.

SELL QST 1938-1960 run $45. W9QON, Jerry Miller, 8414 Keystone, Skokie, Ill.

OKLAHOMANS! Sell DX100B, $150, bought new in 1958. Worked W.A.S. and W.A.C. Try it—buy it at W5BMQ, Dick Sloan, 321 Madison, Purcell, Okla.

SALE: Navy RAO2, also RAO6, 110V 60r, $70, 1223 Averill Ave., San Pedro, Calif.

WANTED Receiving and transmitting equipment, manuals. Indicate condx, price. K4GFM, 203 Del Hall, Ft. Myers, Arlington, Va.

BRAND New PolyComm 10-11 meter transceiver, 6-12V DC and 117V AC, $159.50; Master Mobile #750 loading coil, $10; Instructograph with tapes, $5.00; brand new Federal RG 8/U 100', $11.50; Triplett made tube tester; Health AM-2. WA2DJJ, West Marshall Drive, RD #1, Poughkeepsie, N. Y.

SELL: Hammarlund crystal calibrator, $10.00. KIIIK.

SELL: TR-2 rotator, indicator, cable. Vibroplex Original DeLuxe. Best offer. W1VOK.

WANTED: Collins 70E-8A PTO. Must be new or perfect condx. Will pay cash or trade even for pair of new Elmac 4X150As with air system sockets and chimneys plus matching Stancor half KW plate xfrmr, filament xfrmr, and Sarkes Tarzian silicon rectifier Type S-5019. Robert Axton, 3612 McRoberts Road, Pittsburgh 34, Penna.

SELLING Complete station: Globe Scout 680, LA-1, 75S-A VFO; NC-125 w/spkr. All for $270 or sell separately for best offer. Relays, meters, transformers, coax, etc. Myron E. Kirkpatrick, KØKOB, Priarie Home, Mo.

VIKING Kilowatt with desk. Latest model. Like new. You pick up. $1100, cash. W9MWQ.

MUST Sell! SX-42 with R-42 spkr: $60; S-106, $30; 6 meter homebrew 50-watt rig in cabinet, $60; transistorized power supply, $16; Globe Scout DeLuxe, $110. Roger Frankel, K3MLY, 4501 Connecticut Ave. N.W., Washington 8, D. C.

75A-4 and KWS-1 used less than 50 hours since new. Make offer. Must sell. John Spach, Box 86, Edmonds, Washington. PR 8-1824.

WANTED: QSTs for personal collection: Jan. 1917, February 1917, May 1917 and September 1917. W1CUT, Box 1, West Hartford 7, Conn.

TELREX 3-element full size 20 mtr. beam, model 503-A new, with manual. Best offer over $75.00. W3AHC, 48 Carroll St., Westminster, Md.

75A4, Serial #4971, $600; HT37 exciter, almost new, $355. John Cathie, K2PMD, Alexander, Genesee Co., N. Y.

SALE: DX-40, VF-1, B&W low pass, $80; S-40B, QF-1, S-meter, $70; Telrex 2-el. 10M, beam, rotator, $20. Prefer to sell complete station. Will throw in the mike, etc. You pay postage. Louis Gross, W2KWO, 139 Berkshire Place, Irvington, N. J. Tel. ES 2-8778.

Designed for

Application

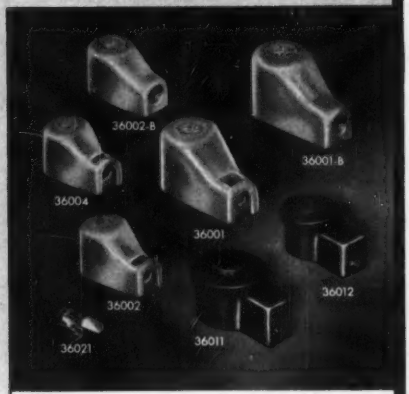


PLATE AND GRID CAPS

Illustrated are the stock military and standard ceramic Millen plate and grid caps and the snap lock caps for mobile and industrial applications requiring tighter than normal grip. Standard plate caps have phosphor bronze clips; military plate caps have beryllium copper clips.

JAMES MILLEN MFG. CO., INC.

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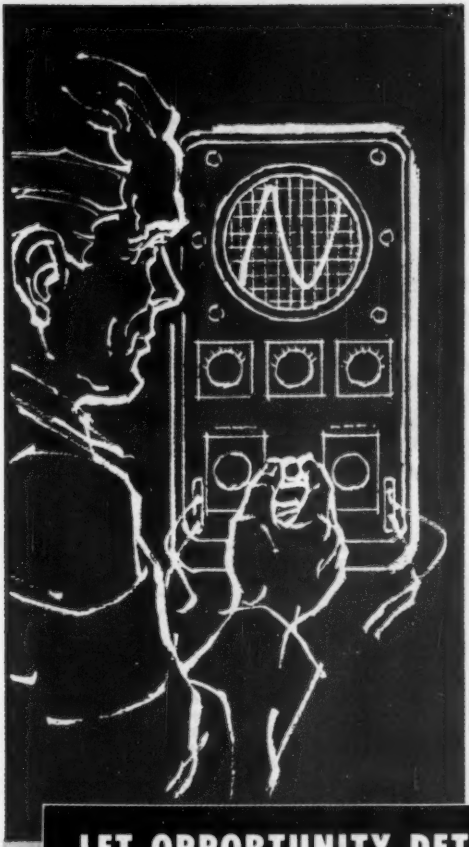
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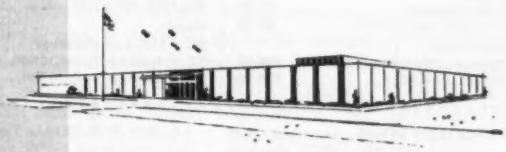
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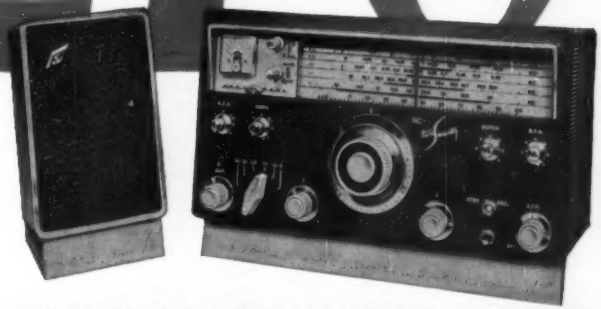
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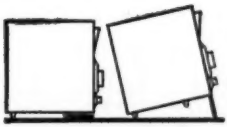
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